Technical Information

Process Gas Chromatograph
GC8000
Installation Manual

GC8000

TI 11B08A01-01E

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YOKOGAWA ◆

Yokogawa Electric Corporation
2-9-32, Nakacho, Musashino-shi, Tokyo, 180-8750 Japan
Tel.: 81-422-52-5617 Fax.: 81-422-52-6792

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◆ Notice

This Manual provides technical information for installing a GC8000 at site.

When installing or checking the installation of the GC8000, read the precautions carefully.

■ Regarding This Manual

- This Manual should be passed on to the end user.
- Read this manual carefully and fully understand how to operate this product before you start operation.
- All rights reserved. No part of this manual may be reproduced in any form without Yokogawa's written permission.
- The contents of this manual are subject to change without prior notice.
- Great effort has been made to ensure that the descriptions in this Manual are correct. However, if you notice any error or inconsistency, please inform Yokogawa Electric Corporation.

■ Regarding Protection, Safety, and Prohibition Against Unauthorized Modification

- For the protection and safe use of the product and the system controlled by it, be sure to follow the safety instructions described in this manual. Safety is not guaranteed if you do not follow these instructions.
- The following safety symbol marks are used on the product concerned or in this Manual:

WARNING

A WARNING sign denotes a hazard. It calls attention to a procedure, practice, condition or the like, which, if not correctly performed or adhered to, could result in injury or death of personnel.

CAUTION

A CAUTION sign denotes a hazard. It calls attention to a procedure, practice, condition or the like, which, if not correctly performed or adhered to, could result in damage to or destruction of part or all of the product.

IMPORTANT

Indicates that operating the hardware or software in this manner may damage it or lead to system failure.

NOTE

Draws attention to information essential for understanding the operation and features.

TIP

Gives information that complements the present topic.

See Also

Gives reference locations for further information on the topic.

Protective ground terminal:
In order to provide protection against electrical shock in case of a fault. This symbol indicates that the terminal must be connected to ground prior to operation of equipment.

Function ground terminal:
In order to provide protection against noise. This symbol indicates that the terminal must be connected to ground prior to operation of equipment.

- If protection/safety circuits are to be used for the product or the system controlled by it, they should be installed outside of the product.
- When you replace parts or consumables of the product, use those specified by us.
- Do not modify the product.

Exemption from Responsibility

- Yokogawa Electric Corporation does not make any warranties regarding the product except for those mentioned in the WARRANTY that is provided separately.
- Yokogawa Electric Corporation assumes no liability to any party for any loss or damage, direct or indirect, caused by the use or any unpredictable defect of the product.

ATEX Documentation

The procedure is only applicable to the countries in European Union.

GB

All instruction manuals for ATEX Ex related products are available in English, German and French. Should you require Ex related instructions in your local language, you are to contact your nearest Yokogawa office or representative.

DK

Alle brugervejledninger for produkter relateret til ATEX Ex er tilgængelige på engelsk, tysk og fransk. Skulle De ønske yderligere oplysninger om håndtering af Ex produkter på eget sprog, kan De rette henvendelse herom til den nærmeste Yokogawa afdeling eller forhandler.

I

Tutti i manuali operativi di prodotti ATEX contrassegnati con Ex sono disponibili in inglese, tedesco e francese. Se si desidera ricevere i manuali operativi di prodotti Ex in lingua locale, mettersi in contatto con l'ufficio Yokogawa più vicino o con un rappresentante.

E

Todos los manuales de instrucciones para los productos antiexplosivos de ATEX están disponibles en inglés, alemán y francés. Si desea solicitar las instrucciones de estos artículos antiexplosivos en su idioma local, deberá ponerse en contacto con la oficina o el representante de Yokogawa más cercano.

NL

Alle handleidingen voor producten die te maken hebben met ATEX explosiebeveiliging (Ex) zijn verkrijgbaar in het Engels, Duits en Frans. Neem, indien u aanwijzingen op het gebied van explosiebeveiliging nodig hebt in uw eigen taal, contact op met de dichtstbijzijnde vestiging van Yokogawa of met een vertegenwoordiger.

SF

Kaikkien ATEX Ex -tyyppisten tuotteiden käyttöhjeet ovat saatavilla englannin-, saksan- ja ranskankielisinä. Mikäli tarvitsette Ex -tyyppisten tuotteiden ohjeita omalla paikallisella kielellännne, ottakaa yhteyttä lähimpään Yokogawa-toimistoon tai -edustajaan.

P

Todos os manuais de instruções referentes aos produtos Ex da ATEX estão disponíveis em Inglês, Alemão e Francês. Se necessitar de instruções na sua língua relacionadas com produtos Ex, deverá entrar em contacto com a delegação mais próxima ou com um representante da Yokogawa.

F

Tous les manuels d'instruction des produits ATEX Ex sont disponibles en langue anglaise, allemande et française. Si vous nécessitez des instructions relatives aux produits Ex dans votre langue, veuillez bien contacter votre représentant Yokogawa le plus proche.

D

Alle Betriebsanleitungen für ATEX Ex bezogene Produkte stehen in den Sprachen Englisch, Deutsch und Französisch zur Verfügung. Sollten Sie die Betriebsanleitungen für Ex-Produkte in Ihrer Landessprache benötigen, setzen Sie sich bitte mit Ihrem örtlichen Yokogawa-Vertreter in Verbindung.

S

Alla instruktionsböcker för ATEX Ex (explosionssäkra) produkter är tillgängliga på engelska, tyska och franska. Om Ni behöver instruktioner för dessa explosionssäkra produkter på annat språk, skall Ni kontakta närmaste Yokogawakontor eller representant.

GR

Όλα τα εγχειρίδια λειτουργίας των προϊόντων με ATEX Ex διατίθενται στα Αγγλικά, Γερμανικά και Γαλλικά. Σε περίπτωση που χρειάζεστε οδηγίες σχετικά με Ex στην τοπική γλώσσα παρακαλούμε επικοινωνήστε με το πλησιέστερο γραφείο της Yokogawa ή αντιπρόσωπο της.

SK

Všetky návody na obsluhu pre prístroje s ATEX Ex sú k dispozícii v jazyku anglickom, nemeckom a francúzskom. V prípade potreby návodu pre Ex-prístroje vo Vašom národnom jazyku, skontaktujte prosím miestnu kanceláriu firmy Yokogawa.

CZ

Všechny uživatelské příručky pro výrobky, na něž se vztahuje nevýbušné schválení ATEX Ex, jsou dostupné v angličtině, němčině a francouzštině. Požadujete-li pokyny týkající se výrobků s nevýbušným schválením ve vašem lokálním jazyku, kontaktujte prosím vaši nejbližší reprezentační kancelář Yokogawa.

LT

Visos gaminiø ATEX Ex kategorijos Eksploatavimo instrukcijos teikiami anglø, vokieèiø ir prancûzø kalbomis. Norëdami gauti prietaisø Ex dokumentacijà kitomis kalbomis susisiekite su artimiausiu bendrovës “Yokogawa” biuru arba atstovu.

LV

Visas ATEX Ex kategorijas izstrâdâjumu Lietoðanas instrukcijas tiek piegâdâtas angïu, vâcu un franèu valodâs. Ja vçlaties saòemt Ex ierîèu dokumentâciju citâ valodâ, Jums ir jâsazinâs ar firmas Jokogava (Yokogawa) tuvâko ofisu vai pârstâvi.

EST

Kõik ATEX Ex toodete kasutamisjuhendid on esitatud inglise, saksa ja prantsuse keeles. Ex seadmete muukeelse dokumentatsiooni saamiseks pöörduge lähima Iokagava (Yokogawa) kontori või esindaja poole.

PL

Wszystkie instrukcje obsługi dla urządzeń w wykonaniu przeciwwybuchowym Ex, zgodnych z wymaganiami ATEX, dostępne są w języku angielskim, niemieckim i francuskim. Jeżeli wymagana jest instrukcja obsługi w Państwa lokalnym ję zyku, prosimy o kontakt z najbliższym biurem Yokogawy.

SLO

Vsi predpisi in navodila za ATEX Ex sorodni pridelki so pri roki v angliščini, nemščini ter francoščini. Èe so Ex sorodna navodila potrebna v vašem tukejnjem jeziku, kontaktirajte vaš najbliši Yokogawa office ili predstaunika.

H

Az ATEX Ex mûszerek gépkönyveit angol, német és francia nyelven adjuk ki. Amennyiben helyi nyelven kérik az Ex eszközök leírásait, kérjük keressék fel a legközelebbi Yokogawa irodát, vagy képviseletet.

BG

Всички упътвания за продукти от серията ATEX Ex се предлагат на английски, немски и френски език. Ако се нуждаете от упътвания за продукти от серията Ex на родния ви език, се свържете с най-близкия офис или представителство на фирма Yokogawa.

RO

Toate manualele de instructiuni pentru produsele ATEX Ex sunt in limba engleza, germana si franceza. In cazul in care doriti instructiunile in limba locala, trebuie sa contactati cel mai apropiat birou sau reprezentant Yokogawa.

M

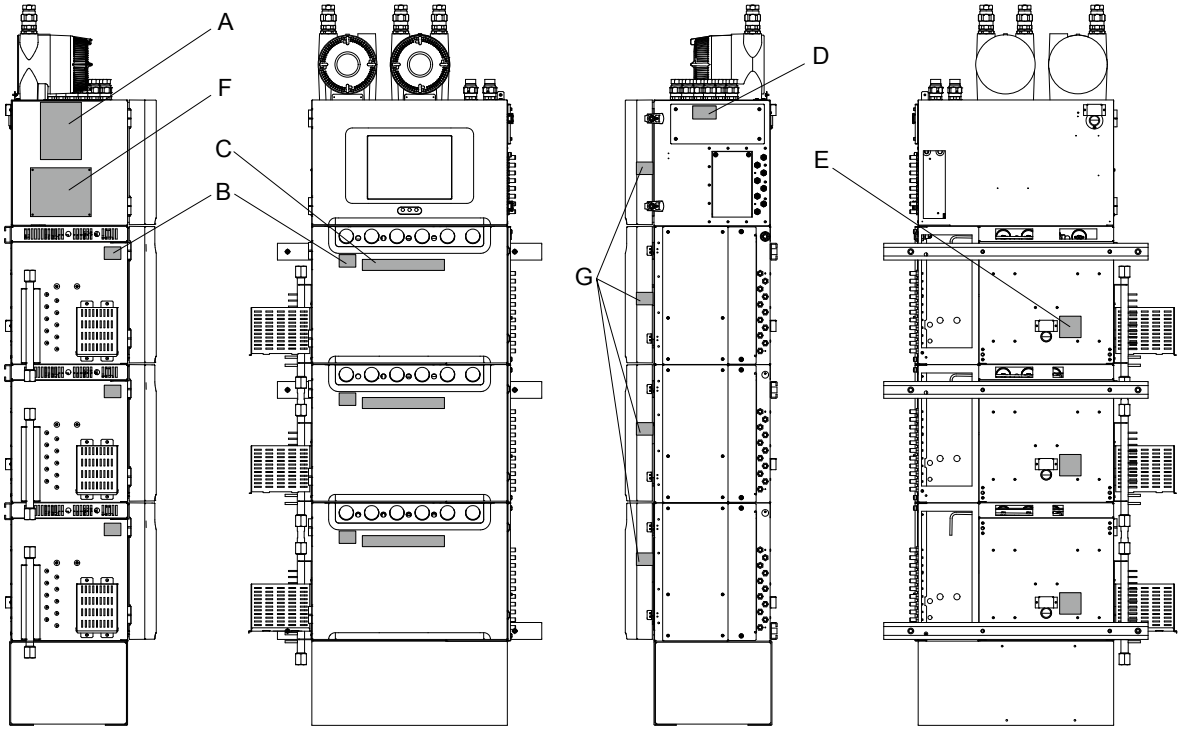
Il manwali kollha ta ̓l istruzzjonijiet għal prodotti mmarbuta ma’ ATEX ̓Ex huma disponibbli bl-Ingliż, bil-Ġermaniż u bil-Franċiż. Jekk tkun teħtieġ struzzjonijiet marbuta ma’ Ex fil-lingwa lokali tiegħek, għandek tikkuntattja lill-eqreb rappreżentan jew uffiċċju ta’ Yokogawa

.

◆ Labeling

Labels are attached to the product for safety. Read each description.

Label D is applicable only to TIIS explosion protection. Label G is for ATEX, IECEx and NEPSI.



[Left side] [Front] [Right side] [Back]

B

⚠ WARNING

Hot surfaces

⚠ 警告

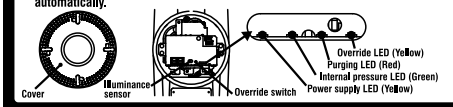
表面が高温です。
注意して下さい。

A

Read the instruction manual thoroughly before use override function.

Override function manual

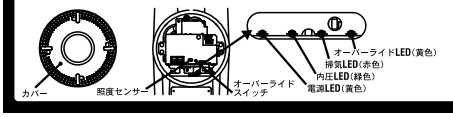
1. Ensure that the surrounding gas atmosphere is well below the lower explosive limit or comletely safe (the area is safe and non-hazard) by using gas detector, then remove the cover of flameproof enclosure.
2. When the illuminance sensor detects light and pressing the override switch, the power is supplied to electric circuit , isothermal oven and programmed temperature oven even if the internal pressure dropped below the specified minimum value.
3. When the cover is replaced to safety device again , this function turns off automatically.



オーバーライド機能を使用する場合は、
取扱説明書の注意事項を必ず読んでからお使いください。

オーバーライド機能の使用手順

1. 周囲の雰囲気が充分に爆発下限界以下になっていることを、ガス検知器などで確認しながら、耐圧容器のカバーを取り外してください。
2. 照度センサが光を感知してオーバーライドスイッチを押すと、規定の最小内圧が保たれない状態で、電気回路部、恒温槽、昇温槽に電源が供給されます。
3. 修理等が終了した後にカバーを取り付けると、自動的にオーバーライドスイッチ機能はオフになります。



G (ATEX, IECEx, NEPSI)

⚠ WARNING

After de-energizing, delay 25 minutes before opening

D (TIIS)

⚠ CAUTION

Use heat-resistant cables with maximum allowable temperature of 80˚C or above for pressurized enclosure.

⚠ 注意

内圧容器の外部導線は、最高許容温度が80℃以上のものを使用すること。

E

⚠ WARNING

High Temperature oven exhaust air. Keep hands, electrical cables, gas lines, chart paper and other items safely clear of exhaust stream.

⚠ 警告

排気エアーが高温です。注意して下さい。
手や電気のケーブル、ガスライン、
チャートペーパーなどを排気口に
近づけないで下さい。

C

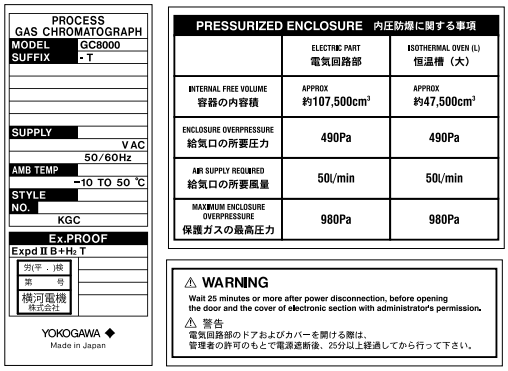
⚠ CAUTION HIGH TEMPERATURE

Do not touch the oven and parts inside oven as temperature inside the oven is hot even after power off. Allow one hour for cool down with purge air.

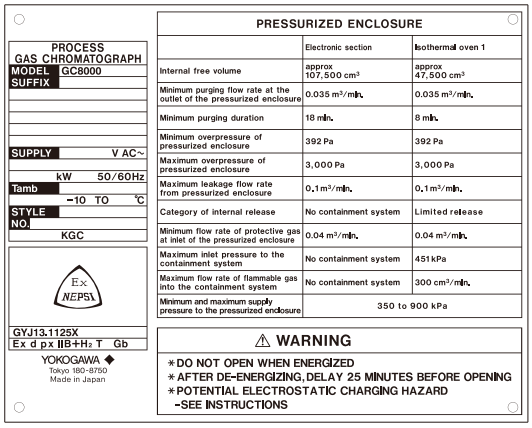
⚠ 高温注意

通電停止直後は，内部が高温になっています。通電を停止した後 1時間以上保護ガスの供給を保ち，内部および内部の部品に触れないでください。

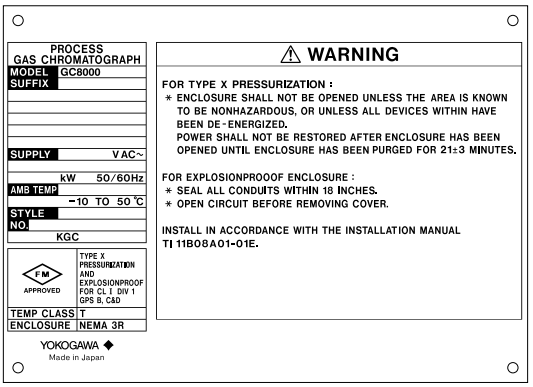
F TIIS



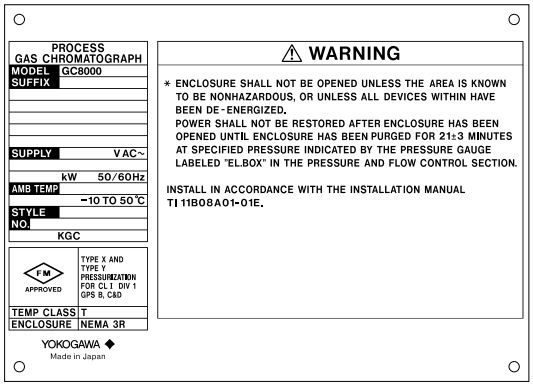
NEPSI



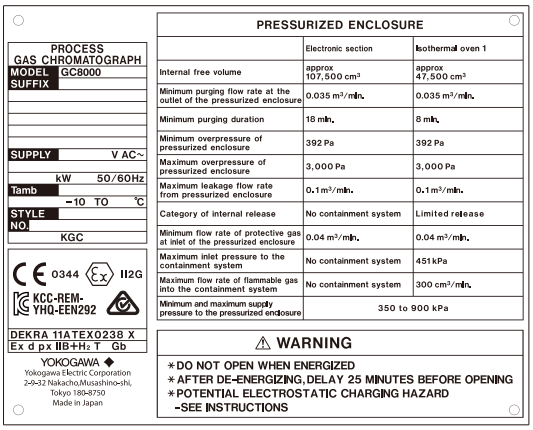
FM-X


PROCESS
GAS CHROMATOGRAPH
MODEL GC8000
SUFFIX
SUPPLY V AC~
kW 50/60Hz
AMB TEMP −10 TO 50 ℃
STYLE
NO.
KGC
APPROVED
TYPE X PRESSURIZATION AND EXPLOSIONPROOF FOR CL I DIV 1 GPS B, C&D
TEMP CLASS T
ENCLOSURE NEMA 3R
YOKOGAWA ◆
Made in Japan
⚠ WARNING
FOR TYPE X PRESSURIZATION :
＊ ENCLOSURE SHALL NOT BE OPENED UNLESS THE AREA IS KNOWN TO BE NONHAZARDOUS, OR UNLESS ALL DEVICES WITHIN HAVE BEEN DE-ENERGIZED.
POWER SHALL NOT BE RESTORED AFTER ENCLOSURE HAS BEEN OPENED UNTIL ENCLOSURE HAS BEEN PURGED FOR 21±3 MINUTES.
FOR EXPLOSIONPROOF ENCLOSURE :
＊ SEAL ALL CONDUITS WITHIN 18 INCHES.
＊ OPEN CIRCUIT BEFORE REMOVING COVER.
INSTALL IN ACCORDANCE WITH THE INSTALLATION MANUAL
TI 11B08A01-01E.

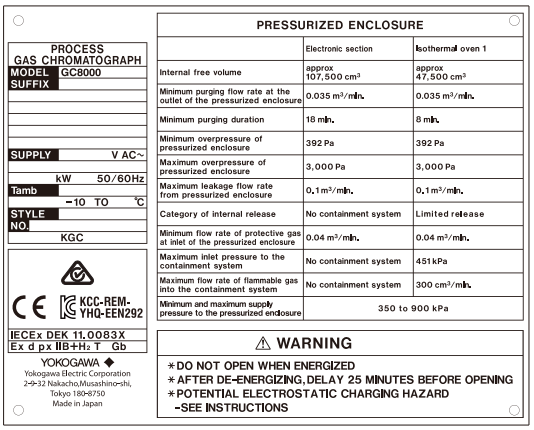
FM-Y


PROCESS
GAS CHROMATOGRAPH
MODEL GC8000
SUFFIX
SUPPLY V AC~
kW 50/60Hz
AMB TEMP −10 TO 50 ℃
STYLE
NO.
KGC
APPROVED
TYPE X AND TYPE Y PRESSURIZATION FOR CL I DIV 1 GPS B, C&D
TEMP CLASS T
ENCLOSURE NEMA 3R
YOKOGAWA ◆
Made in Japan
⚠ WARNING
＊ ENCLOSURE SHALL NOT BE OPENED UNLESS THE AREA IS KNOWN TO BE NONHAZARDOUS, OR UNLESS ALL DEVICES WITHIN HAVE BEEN DE-ENERGIZED.
POWER SHALL NOT BE RESTORED AFTER ENCLOSURE HAS BEEN OPENED UNTIL ENCLOSURE HAS BEEN PURGED FOR 21±3 MINUTES AT SPECIFIED PRESSURE INDICATED BY THE PRESSURE GAUGE LABELED "EL.BOX" IN THE PRESSURE AND FLOW CONTROL SECTION.
INSTALL IN ACCORDANCE WITH THE INSTALLATION MANUAL
TI 11B08A01-01E.

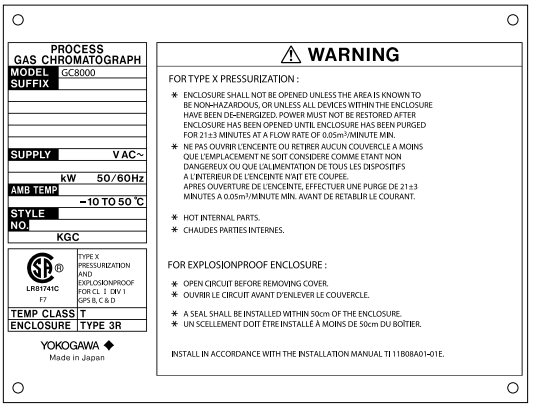
ATEX



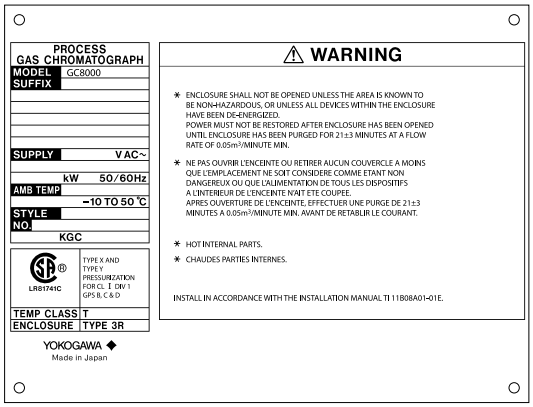
IECEx



CSA-X


PROCESS
GAS CHROMATOGRAPH
MODEL GC8000
SUFFIX
SUPPLY V AC~
kW 50/60Hz
AMB TEMP −10 TO 50 ℃
STYLE
NO.
KGC
LR81741C
F7
TYPE X PRESSURIZATION AND EXPLOSIONPROOF FOR CL I DIV 1 GPS B, C & D
TEMP CLASS T
ENCLOSURE TYPE 3R
YOKOGAWA ◆
Made in Japan
⚠ WARNING
FOR TYPE X PRESSURIZATION :
＊ ENCLOSURE SHALL NOT BE OPENED UNLESS THE AREA IS KNOWN TO BE NON-HAZARDOUS, OR UNLESS ALL DEVICES WITHIN THE ENCLOSURE HAVE BEEN DE-ENERGIZED. POWER MUST NOT BE RESTORED AFTER ENCLOSURE HAS BEEN OPENED UNTIL ENCLOSURE HAS BEEN PURGED FOR 21±3 MINUTES AT A FLOW RATE OF 0.05m3/MINUTE MIN.
＊ NE PAS OUVRIR L'ENCEINTE OU RETIRER AUCUN COUVERCLE A MOINS QUE L'EMPLACEMENT NE SOIT CONSIDERE COMME ETANT NON DANGEREUX OU QUE L'ALIMENTATION DE TOUS LES DISPOSITIFS A L'INTERIEUR DE L'ENCEINTE N'AIT ETE COUPEE.
APRES OUVERTURE DE L'ENCEINTE, EFFECTUER UNE PURGE DE 21±3 MINUTES A 0.05m3/MINUTE MIN. AVANT DE RETABLIR LE COURANT.
＊ HOT INTERNAL PARTS.
＊ CHAUDES PARTIES INTERNES.
FOR EXPLOSIONPROOF ENCLOSURE :
＊ OPEN CIRCUIT BEFORE REMOVING COVER.
＊ OUVRIR LE CIRCUIT AVANT D'ENLEVER LE COUVERCLE.
＊ A SEAL SHALL BE INSTALLED WITHIN 50cm OF THE ENCLOSURE.
＊ UN SCELLEMENT DOIT ÊTRE INSTALLÉ À MOINS DE 50cm DU BOÎTIER.
INSTALL IN ACCORDANCE WITH THE INSTALLATION MANUAL TI 11B08A01-01E.

CSA-Y


PROCESS
GAS CHROMATOGRAPH
MODEL GC8000
SUFFIX
SUPPLY V AC~
kW 50/60Hz
AMB TEMP −10 TO 50 ℃
STYLE
NO.
KGC
LR81741C
TYPE X AND TYPE Y PRESSURIZATION FOR CL I DIV 1 GPS B, C & D
TEMP CLASS T
ENCLOSURE TYPE 3R
YOKOGAWA ◆
Made in Japan
⚠ WARNING
＊ ENCLOSURE SHALL NOT BE OPENED UNLESS THE AREA IS KNOWN TO BE NON-HAZARDOUS, OR UNLESS ALL DEVICES WITHIN THE ENCLOSURE HAVE BEEN DE-ENERGIZED.
POWER MUST NOT BE RESTORED AFTER ENCLOSURE HAS BEEN OPENED UNTIL ENCLOSURE HAS BEEN PURGED FOR 21±3 MINUTES AT A FLOW RATE OF 0.05m3/MINUTE MIN.
＊ NE PAS OUVRIR L'ENCEINTE OU RETIRER AUCUN COUVERCLE A MOINS QUE L'EMPLACEMENT NE SOIT CONSIDERE COMME ETANT NON DANGEREUX OU QUE L'ALIMENTATION DE TOUS LES DISPOSITIFS A L'INTERIEUR DE L'ENCEINTE N'AIT ETE COUPEE.
APRES OUVERTURE DE L'ENCEINTE, EFFECTUER UNE PURGE DE 21±3 MINUTES A 0.05m3/MINUTE MIN. AVANT DE RETABLIR LE COURANT.
＊ HOT INTERNAL PARTS.
＊ CHAUDES PARTIES INTERNES.
INSTALL IN ACCORDANCE WITH THE INSTALLATION MANUAL TI 11B08A01-01E.

Introduction

This manual describes the installation of the GC8000 Process Gas Chromatograph.
Please read the following documents before installing and using the GC8000 system.

Documents Related to the GC8000 Process Gas Chromatograph

User's manuals

The product comes with the following user's manuals.

- **User's manuals that do not depend upon the specifications of the product:**

  GC8000 Process Gas Chromatograph (IM 11B08A01-01E)
  Process Gas Chromatograph GC8000 Installation Manual (TI 11B08A01-01E, this manual)
  General Specifications Model GC8000 Process Gas Chromatograph (GS 11B08A01-01E)
  GC8000 Process Gas Chromatograph Basic Operation and Startup (IM 11B08A01-61E)
- **User's manuals for related products:**

  PCAS PC Analyzer Server Software (IM 11B06B01-01E)
  ASET Analyzer Server Engineering Terminal Software (IM 11B06C01-01E)
  ASGW Analyzer Server Gateway Software (IM 11B06E01-01E)
  ASIU Analyzer Server Interface Unit Software (IM 11B06F01-01E)
  GCVT Virtual Tech Software (IM 11B08C02-01E)
  ANABUS Ethernet System Redundancy Setting Manual (TI 11B03A03-14E)

Operation Data

Operation data is supplied with the operation manuals in the delivered package and contains the following application specific information required to use the GC8000 Process Gas Chromatograph.

- Process conditions and measurement range
- Instrument specifications and operating conditions
- Standard sample for calibration
- Column system and column
- Miscellaneous data

  Chromatogram, base line, repeatability, etc.
- Analyzer flow diagram and installation
- Parts composition table
- General connection diagram
- Sampling system diagram (when supplied by Yokogawa)

General Precautions

WARNING

In order to analyze gases, process gas chromatographs use various kinds of process gases and utility gases.

Since these gases are typically combustible, combustion-sustaining, toxic, odorous, resolvable, polymerizing, or corrosive, refer to the “Safety Information” in our approval drawings and others to ensure safety thoroughly before using them.

WARNING

- The GC8000 weighs about 100 to 220 kg. Unpack it near the installation site. Use a transportation machine to move it. Handle it carefully to prevent it from falling.
- For lifting and carrying equipment, use two brackets at which GC8000 is fixed to the crate (made of wood etc.). Use wall-mounting brackets or their equivalent (unpainted brackets are attached to self-standing type for transportation).
- Up to two protection system may be included, each of which weighs approximately 7 kg, are installed on top of the GC8000. Therefore, the center of gravity is higher than the center of the analyzer body.

CAUTION

- Since the GC8000 is a precision instrument, take care when handling it to avoid impact.
- The GC8000 is designed for use under specified environment (over voltage category, pollution degree, ambient temperature, flowrate and pressure of sample and utility gas and specification of electric power). It is out of warranty against occured result in case when exceed these specs.
- Use the GC8000 within the range of your purchase specifications.

  Yokogawa assumes no responsibility for problems resulting from use by the customer outside the purchase specifications.

  If the GC8000 needs to be modified or repaired, please contact your nearest Yokogawa representative. Yokogawa assumes no responsibility for results where the customer or any third party has attempted to modify or repair this product.
- For cleaning of analyzer, do not use any abrasives or organic solvent.

CAUTION

This instrument is a Class A product for EMC standard (Emission), and is designed for use in an industrial environment. Please use this instrument in an industrial environment only.

Complying with EMC Standard for ATEX, IECEx, NEPSI and TIIS (/KC):

- EN61326-1 Class A (Emission)
- EN61326-1, EN61326-2-3 (Immunity)
- Korea Electromagnetic Conformity Standard

IMPORTANT

- Read the attached instruction manual before operating the GC8000.
- The instruments must be installed and operated according to the installation manual, instruction manual, approval drawings, and operation data.

How to dispose the batteries:

This is an explanation about the new EU Battery Directive (DIRECTIVE 2006/66/EC). This directive is only valid in the EU.

Batteries are included in this product (except for TIIS). Batteries incorporated into this product cannot be removed by yourself.Dispose them together with this product.

When you dispose this product in the EU,contact your local Yokogawa Europe B.V.office. Do not dispose them as domestic household waste.

Battery type: Poly-carbon monofluoride Lithium battery

Notice: The symbol (see above) means they shall be sorted out and collected as ordained in ANNEX II in DIRECTIVE 2006/66/EC.

How to dispose the Desktop type Communication converter (K9806AT) or Signal interrupter (K9606AB):

Waste Electrical and Electronic Equipment (WEEE), Directive 2002/96/EC (This directive is only valid in the EU.)

This product complies with the WEEE Directive (2002/96/EC) marking requirement.

The affixed product label (see below) indicates that you must not discard this electrical/ electronic product in domestic household waste.

Product Category

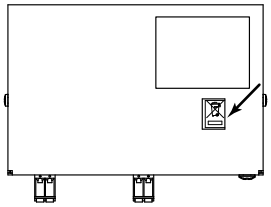
With reference to the equipment types in the WEEE directive Annex 1, this product is classified as a “Monitoring and Control instrumentation” product.

Do not dispose in domestic household waste.

To return unwanted products, contact your local Yokogawa Europe B. V. office.

- Labeling

  The following label is placed on the top side of the product.



Precautions Against Electrostatic Damage

IMPORTANT

Electrostatic discharge may damage the operation panel. Handle them after discharging static electricity.

When handling cards with IC components mounted on them for maintenance or setting changes, take full precautions against electrostatic problems.

- When storing or carrying cards, enclose them in a conductive bag or antistatic bag. (Cards as shipped by Yokogawa are enclosed in a conductive bag or antistatic bag labeled with cautions against electrostatic problems.)
- When servicing cards, wear a wrist strap grounded via a 1 MΩ resistance. Connect the wrist strap to a ground terminal.
- When servicing cards on the bench, wear a wrist strap and place them on a conductive sheet grounded via a 1 MΩ resistance. Keep easily-chargeable plastic materials away from the bench.
- Never touch components mounted on the cards, the pattern side, connectors, pin components, etc. with bare hands, unless using a wrist strap and a conductive sheet.

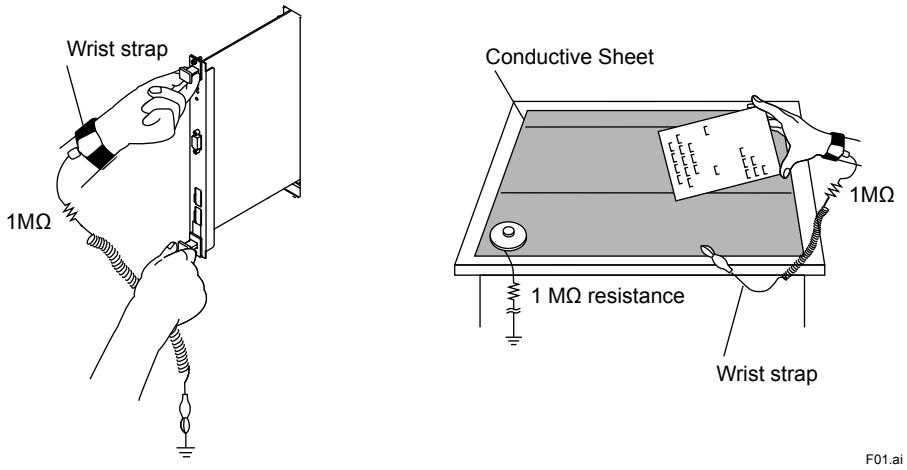


Figure 1 Example of wrist strap and conductive sheet

Replacing parts

Always use parts specified by Yokogawa when replacing parts. For replacement, see “6. Maintenance” in the User’s Manual (IM 11B08A01-01E).

Maintenance and Repair

Instrument modification or parts replacement by any person other than an authorized representative of Yokogawa Electric Corporation is prohibited.

CAUTIONS WHEN USING EXPLOSION-PROTECTED INSTRUMENTS

The GC8000 is designed to protect against explosion.

When the analyzer is used in a hazardous area, observe the following precautions.

Since the applicable standard differs depending on the specifications of the analyzer to be used, check the specifications of your analyzer.

Type of explosion protection

To assure explosion protection, the GC8000 has a pressurized and flameproof enclosure, meeting the following standards (flameproof enclosure is not provided in FM-Y, CSA-Y):

<GC8000-F (FM-X), GC8000-G (FM-Y)>

Type X pressurization and Explosionproof for Class I, Division 1, Group B, C and D

(Described as FM-X hereafter)

Type X and Y pressurization for Class I, Division 1, Group B, C & D

(Described as FM-Y hereafter)

T1 (programmed-temperature oven 320°C max., isothermal oven 225°C max., liquid-sample valve 250°C max.)

T2 (programmed-temperature oven 225°C max., isothermal oven 225°C max., liquid-sample valve 225°C max.)

T3 (programmed-temperature oven 145°C max., isothermal oven 145°C max., liquid-sample valve 145°C max.)

T4 (programmed-temperature oven 95°C max., isothermal oven 95°C max., liquid-sample valve 95°C max.)

<GC8000-C (CSA-X), GC8000-D (CSA-Y)>

Type X pressurization and Explosionproof for Class I, Division 1, Group B, C and D

(Described as CSA-X hereafter)

Type X and Y pressurization for Class I, Division 1, Group B, C & D

(Described as CSA-Y hereafter)

T1 (programmed-temperature oven 320°C max., isothermal oven 225°C max., liquid-sample valve 250°C max.)

T2 (programmed-temperature oven 225°C max., isothermal oven 225°C max., liquid-sample valve 225°C max.)

T3 (programmed-temperature oven 145°C max., isothermal oven 145°C max., liquid-sample valve 145°C max.)

T4 (programmed-temperature oven 95°C max., isothermal oven 95°C max., liquid-sample valve 95°C max.)

<GC8000-A (ATEX)>

ATEX: Group II Category 2G, DEKRA 11ATEX0238 X *

Ex d px II B +H_2 T1 Gb (programmed-temperature oven 320°C max., isothermal oven 225°C max., liquid-sample valve 250°C max.)

Ex d px II B + H_2 T2 Gb (programmed-temperature oven 225°C max., isothermal oven 225°C max., liquid-sample valve 225°C max.)

Ex d px II B + H_2 T3 Gb (programmed-temperature oven 145°C max., isothermal oven 145°C max., liquid-sample valve 145°C max.)

Ex d px II B + H_2 T4 Gb (programmed-temperature oven 95°C max., isothermal oven 95°C max., liquid-sample valve 95°C max.)

* : The symbol “X” used to denote specific conditions of use
The symbol “X” is used to provide a means of identifying that essential information for the installation, use, and maintenance of the equipment is contained within the certificate.
- Warning in the label refers you to read the instruction manual for an avoidance of static risk.
- The threaded type and size of the flameproof enclosure is only uses “M25x1.5”.
  That is the reason why no indication on the flameproof enclosure.
  On the other hand, the threaded adapter has the indication of its own type and size.
- The gap between flameproof joints is different from the standard values of the flameproof standard.
  The joint dimensions of the flameproof enclosure differ from the minimum or maximum values asa mentioned in the Ex d standard.
  Since the modification is not allowed, this manual gives out no detailed information.
- The instrument modification or parts replacement by any person other than authorized representative of Yokogawa Electric Corporation is prohibited and will void the flameproof certifications.
- All externally powered input signals into the pressurized enclosure shall be isolated by external relays controlled by the Ex px protection system(Ex px safety device).

<GC8000-E (IECEx)>

IECEx certified: IECEx DEK 11.0083X *

Ex d px II B +H_2 T1 Gb (programmed-temperature oven 320°C max., isothermal oven 225°C max., liquid-sample valve 250°C max.)

Ex d px II B + H_2 T2 Gb (programmed-temperature oven 225°C max., isothermal oven 225°C max., liquid-sample valve 225°C max.)

Ex d px II B + H_2 T3 Gb (programmed-temperature oven 145°C max., isothermal oven 145°C max., liquid-sample valve 145°C max.)

Ex d px II B + H_2 T4 Gb (programmed-temperature oven 95°C max., isothermal oven 95°C max., liquid-sample valve 95°C max.)

* : The symbol “X” used to denote specific conditions of use
The symbol “X” is used to provide a means of identifying that essential information for the installation, use, and maintenance of the equipment is contained within the certificate.
- Warning in the label refers you to read the instruction manual for an avoidance of static risk.
- The threaded type and size of the flameproof enclosure is only uses “M25x1.5”.
  That is the reason why no indication on the flameproof enclosure.
  On the other hand, the threaded adapter has the indication of its own type and size.
- The gap between flameproof joints is different from the standard values of the flameproof standard.
  The joint dimensions of the flameproof enclosure differ from the minimum or maximum values asa mentioned in the Ex d standard.
  Since the modification is not allowed, this manual gives out no detailed information.
- The instrument modification or parts replacement by any person other than authorized representative of Yokogawa Electric Corporation is prohibited and will void the flameproof certifications.
- All externally powered input signals into the pressurized enclosure shall be isolated by external relays controlled by the Ex px protection system(Ex px safety device).

<GC8000-P (NEPSI)>

NEPSI certified: GYJ13.1125X *

Ex d px II B +H_2 T1 Gb (programmed-temperature oven 320°C max., isothermal oven 225°C max., liquid-sample valve 250°C max.)

Ex d px II B + H_2 T2 Gb (programmed-temperature oven 225°C max., isothermal oven 225°C max., liquid-sample valve 225°C max.)

Ex d px II B + H_2 T3 Gb (programmed-temperature oven 145°C max., isothermal oven 145°C max., liquid-sample valve 145°C max.)

Ex d px II B + H_2 T4 Gb (programmed-temperature oven 95°C max., isothermal oven 95°C max., liquid-sample valve 95°C max.)

* : The suffix “X” placed after the certificate number indicates that this product is subject to special conditions for safe use:
- The values of the flamepaths are different from the standard values given in GB 3836.2-2010. Repair of the equipment is only allowed when done by the manufacturer or authorized representative.
- When used in hazardous location, electrostatic discharge should be avoided.
- The minimum overpressure of both electronic section and ovens is 392 Pa.
- The purging time for electronic section is 18 minutes.
- The purging time for ovens is 8 minutes.

<GC8000-T (TIIS)>

TIIS (The Technology Institution of Industrial Safety)

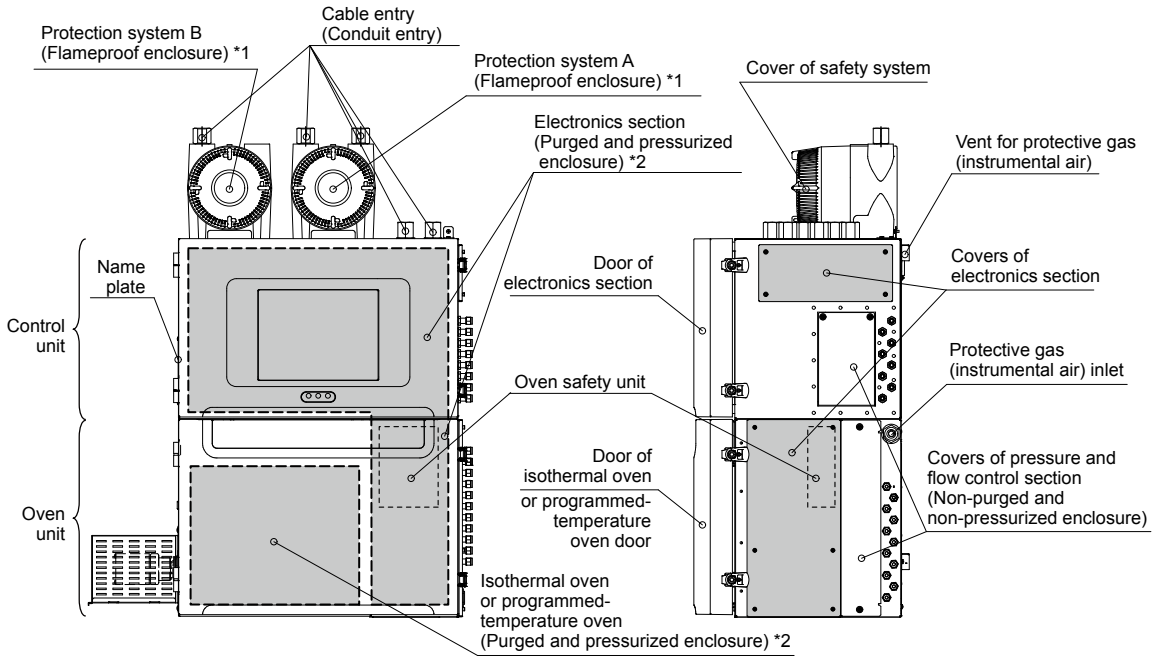
Ex pd II B +H_2 T1 (programmed-temperature oven 320°C max., isothermal oven 225°C max., liquid-sample valve 250°C max.)

Ex pd II B +H_2 T2 (programmed-temperature oven 225°C max., isothermal oven 225°C max., liquid-sample valve 225°C max.)

Ex pd II B +H_2 T3 (programmed-temperature oven 145°C max., isothermal oven 145°C max., liquid-sample valve 145°C max.)

Ex pd II B +H_2 T4 (programmed-temperature oven 95°C max., isothermal oven 95°C max., liquid-sample valve 95°C max.)

Analyzer component names



Note: Replace the following term for FM, CSA explosionproof models.
*1: Protection system A or B (explosionproof enclosure)
*2: Type X pressurization enclosure or Type Y pressurization enclosure

Figure 2 Analyzer component names for explosionproof type

Opening/closing the door

The control unit, and the oven unit (large isothermal oven, standard isothermal oven, programmed temperature oven) have a door fastener with a lock.

Lock the door when operating these devices. The same key is used for all the door fasteners. Do not lose it.

Confirm that the lever cannot be lifted up after locking.

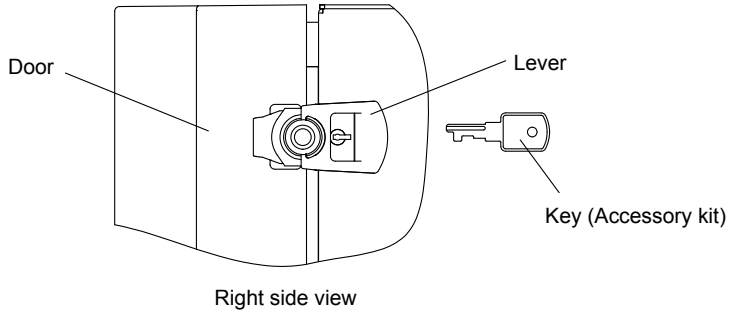


Figure 3 Door fastener

Electronics section

The electronics section of the control unit, and the oven unit (large isothermal oven, standard isothermal oven, programmed temperature oven) is a pressurized enclosure.

Use a hex wrench (an accessory) to open/close the cover of the electronic chamber.

Precautions for protection system (The analyzer with FM-Y, CSA-Y does not have the protection system.)

WARNING

When the cover of the protection system is uninstalled, use a gas detector to check that the concentration of explosive gases in the ambient atmosphere is less than the allowable limit.

The protection system is a flameproof enclosure.

When handling the screws on the cover of the protection system, note the following to avoid damaging the screws since they cannot be repaired.

- Use a hex wrench (option) to tighten/loosen the hexagon socketset screw.
- The cover should be placed in a clean plastic bag or on a clean space to prevent it from contamination.

  Before installing the cover, confirm that the body and screws are not contaminated. If they are, make sure to clean them.
- Since the screws are coated with MOLYKOTE, do not lubricate them.
- When installing the cover, tighten the screws by hand; never use tools.

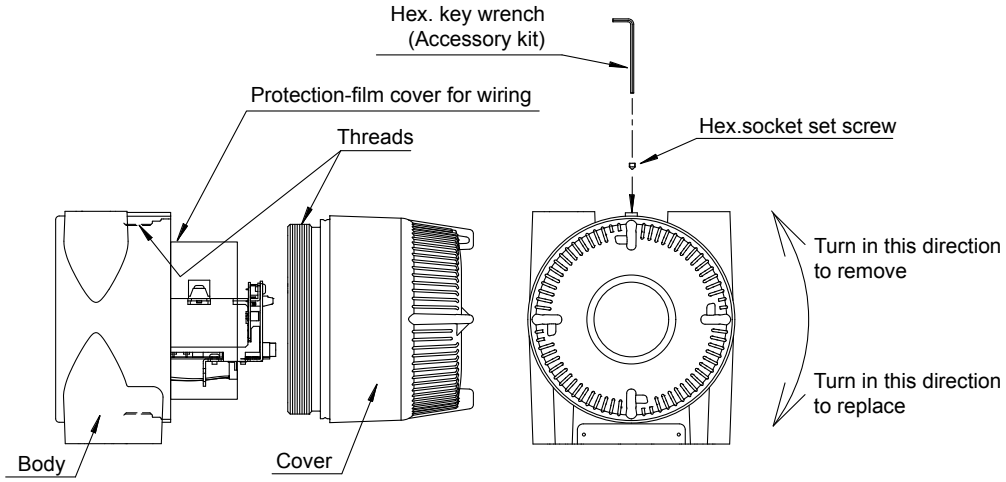


Figure 4 Opening/closing the cover of the protection system

Precautions for hydrogen gas

When using hydrogen gas as the carrier gas, the FID or FPD combustion gas, install the analyzer in a location equipped with a ventilator or where there is sufficient ventilation to ensure safety.

Check for leaks regularly to make sure there are no gas leaks from the pipe joints.

Supply hydrogen gas to this analyzer at 500 ±20 kPa to meet the explosionproof requirements.

Protection gas (instrumental air) pipe

This is the pipe for supplying air to the analyzer for purging pressurized enclosures.

An air pressure of 350 to 900 kPa (500 to 900 kPa for FPD) is required. Use general instrument air as the source and connect the piping to the analyzer PURGE AIR port. A pressure regulator should be installed in-between.

Installation site and environment

The analyzer specifications allow it to be used in hazardous areas as defined by DIV1, GPS B, C & D, T1, T2, T3, T4 (FM, CSA) or Zone 1 IIB + H2T1, T2, T3, T4 (ATEX, IECEx, NEPSI, TIIS). However, never install the analyzer in an area where dense explosive gas exists for a long time.

For the class of hazardous areas:

For FM, refer to Article 500 of the National Electrical Code (NEC).

For CSA, refer to Section 18 of CSA C22.1, Canadian Electrical Code (CEC).

For ATEX or IECEx, see IEC/EN 60079-10-1.

For NEPSI, see GB 3836.14.

For TIIS explosion protection, refer to Article 1 (15) to (17) of the Constructional Requirements for Electrical Equipment for Explosive Atmospheres (Japanese only).

Wiring works

<FM>

WARNING

- All wiring shall comply with National Electric Code ANSI/NFPA 70 and Local Electric Codes.
- In a hazardous area, use conduits for wiring in the protection system or to electronics sections.

CAUTION

- The unused electrical connection ports should be closed with an appropriate flameproof-certified plug.
- Analyzers have pressurized enclosures. The cable end should be sealed in order to maintain pressure to the pressurized enclosure. Otherwise, power is not supplied to the electronics section.

<CSA>

WARNING

- All wiring shall comply with Canadian Electric Code CSA C22.1 and Local Electric Codes.
- In a hazardous area, use conduits for wiring in the protection system or to electronics sections.

CAUTION

- The unused electrical connection ports should be closed with an appropriate flameproof-certified plug.
- Analyzers have pressurized enclosures. The cable end should be sealed in order to maintain pressure to the pressurized enclosure. Otherwise, power is not supplied to the electronics section.

<ATEX, IECEx, NEPSI>

WARNING

- All wiring shall comply with Local Electric Codes and Requirements.
- In a hazardous area, use appropriate flameproof-certified parts for connecting cables.
- All externally powered input signals into the pressurized enclosure shall be isolated by external relays controlled by the Ex px protection system(Ex px safety device).

CAUTION

- The unused electrical connection ports should be closed with an appropriate flameproof-certified plug.
- Analyzers have pressurized enclosures. The cable end should be sealed in order to maintain pressure to the pressurized enclosure. Otherwise, power is not supplied to the electronics section.

<TIIS>

WARNING

- In case of TIIS-certified wiring, the attached cable packing adapters or sealing fitting must be used.

  Otherwise, it does not comply with TIIS regulation.
- Use the wiring to the pressurized enclosure, whose allowable temperature is more than 80°C.

IMPORTANT

Cables should be arranged in an orderly manner in the protection system.

Otherwise, they may damage other parts (e.g. relay).

Maintenance and inspection

Before opening the doors or the covers for maintenance and inspection, be sure to turn off the power and wait for at least 25 minutes. After completing inspections, close the door or cover tightly, check that the specified explosionproof performance is ensured, and then turn on the power. The parts to be checked are described in “6. Maintenance” in the User’s Manual (IM 11B08A01-01E).

If any of the following damage occurs, contact a Yokogawa sales representative or the Yokogawa sales division.

- The screws securing the Protection System (explosionproof construction) are damaged
- The exterior of the enclosures is damaged
- Packings are cracked or deformed

Override function (The analyzer with FM-Y, CSA-Y does not have this function.)

WARNING

When the override function is used, use a gas detector to check that the concentration of explosive gases in the ambient atmosphere is less than the allowable limit.

In this analyzer, if the pressure of the pressurized enclosure (electronics section) drops below a specified level while the power is on, the protection system is activated to stop power supply.

Therefore, if the door of the electronics section is inadvertently opened for maintenance while the power is on, the protection system is activated to cut off the power.

The override function forcibly disables this function.

This function allows operators to open the door or cover of the pressurized enclosure while the power is still on.

This function is activated by opening the cover of the protection system and pressing the override switch while the light sensor is detecting more than 100 (lx) of light.

The function becomes invalid automatically when the cover of the protection system is closed.

Checking the pressure in the pressurized enclosure

The LED (Green) of "POWER" is turned ON and the LED (Red) of "ALARM" is turned OFF when the pressure is in the normal condition. See Figure.5.

The pressurized enclosure is divided into "Electronics section", "Isothermal oven", and "programmed temperature oven". How to check the pressure in each enclosure is as follows.

<Electronics section>

WARNING

When the cover of the protection system is uninstalled, use a gas detector to check that the concentration of explosive gases in the ambient atmosphere is less than the allowable limit.

The status of the protection system can be checked with the LEDs as shown in Figure 5.

The meaning of each LED is written on the status display.

POWER:	ON when power is supplied to the protection system
PRESSURE:	ON when the specified internal pressure is applied to the electronics section. This LED is ON in the normal condition. If the internal pressure becomes low, it turns off.
PURGING:	ON when purging the electronics section. After purging, it turns off. When power is supplied and “PRESSURE” LED is on, this LED turns ON and purging begins. After the electronics section is purged for 21 ± 3 min, the LED turns off and power is supplied to the electronics section. The LED is OFF in the normal condition after purging. If purging ends incompletely, the status of purging is reset and purging begins again.
OVERRIDE:	ON when the override function is activated.

<Isothermal oven>, <programmed temperature oven>

If the internal pressure in the oven becomes low, the following alarms appear on the operation panel.

Top isothermal oven:	Alarm for low internal pressure No. 112 “OVEN1 PRESS DOWN”
Middle isothermal oven or programmed temperature oven:	Alarm for low internal pressure No. 113 “OVEN2 PRESS DOWN”
Bottom isothermal oven:	Alarm for low internal pressure No. 114 “OVEN3 PRESS DOWN”

Alarms are displayed on the “ASET” PC software for the specification without the operation panel on GC8000.

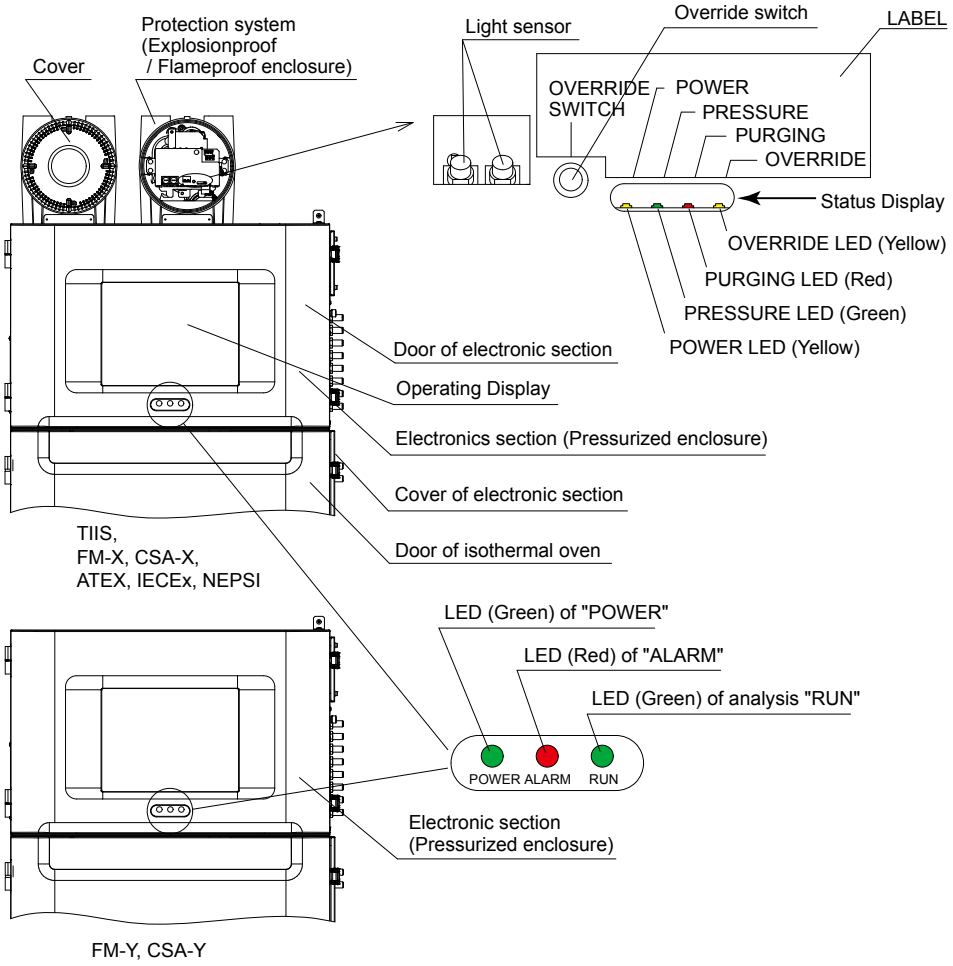


Figure 5

Operation

WARNING

- Do not open the doors and the covers. Refer servicing to propery trained personnel. High voltage and high temperature are presented on the inside parts. If contacted, produce electric shock and burns.
- Before opening the doors and the covers, turn off the power under the permission of the administrator and wait for at least 25 minutes with the Protective gas (instrumental air) supplied.
- Electrostatic charge may cause an explosion hazard.
  Avoid any actions that cause the generation of electrostatic charge, such as rubbing with a dry cloth.
- Do not put anything on the surface of the Operating display (touch operation panel) such as clear protection film. This would be a violation for Ex-proof cirtification requirements.

CAUTION

The oven is extremely hot after turning off the power immediately. Keep the protection gas (instrumental air) supplied for more than an hour after turning off the power. Keep hands away from the oven components.

FM-X, CSA-X, ATEX, IECEx, NEPSI, TIIS

<Power on>

(1) Power is supplied to the protection system (flameproof enclosure).
(2) Protective gas (instrumental air) is supplied to the protective gas (instrumental air) inlet.
(3) When the internal pressure in the electronics section, which is the control unit and oven unit 1 to 3, exceeds 392 (Pa), purging to each electronics section begins.
(4) After 21 ±3 minutes purging, power is applied to the electronics section of the control unit. On the other hand, it does not be applied to the electronics section of the oven unit 1 to 3, the heater and detector in the oven yet.
(5) When the internal pressure in the oven unit 1 to 3 exceeds 392 (Pa), purging to each oven unit begins independently.
(6) After the purging time as follows, power is applied to the electronics section of the oven unit. Then the hydrogen limiting unit, the heater and detector in the oven are ready for operation. The purging time depends on the flameproof certifications.

TIIS, FM, CSA: 9 ±2.5 minutes
ATEX, IECEx, NEPSI: 11 ±3 minutes

<Power off>

(1) The operation and supply of sample to be measured are stopped.
(2) The detector is turned off.
In case of FID, FID with methanizer and FPD, the detector should be “Frame out” with stopping the supply of make-up gas, combustion gas and combustion air. Then, wait for over 4 hours.
(3) Each heater of the isothermal oven (or programmed temperature oven), LSV and FPD is turned off.
(4) Wait until the oven temperature drops to near room temperature. Usually it takes over one hour.
(5) The supply of power to the protection system is stopped.
(6) After the oven temperature drops, the supply of the protective gas (instrumental air) is stopped.

IMPORTANT

In case of emergency, stop the supply of power immediately. In this case, it may damage to the analyzer.

<Low pressure in the pressureized enclosure>

A. Electronics section (control unit, oven unit 1 to 3)

(1) When the internal pressure in the electronics section falls below 392 (Pa), the protection system immediately shuts off the power supply to the control unit and oven unit 1 to 3.
(2) When the internal pressure described above returns to normal, the procedure starts automatically from item (4) in <Power on>.

B. Each isothermal oven (or programmed temperature oven) in the oven unit 1 to 3

(1) When any of internal pressure in the oven falls below 392 (Pa), the control unit immediately shuts off the power supply to the electronics section of the relevant oven.
(2) When the internal pressure in the oven returns to normal, the procedure starts automatically at item (6) in <Power on>.

FM-Y, CSA-Y

<Power on>

(1) Protective gas (instrumental air) is supplied to the protective gas (instrumental air) inlet.
(2) The pressure value is checked if it is indicated the specified one at the pressure gauge.
(3) Wait for 21±3 minutes to keep the protective gas (instrumental air) supplied.
(4) Power is supplied to the electronics section of the control unit.
(5) Check if the “Elec. Press. Down” error is not outputted. When this alarm is outputted, stop the supply of power. In this case, the procedure starts automatically described in “A. Electronics section (control unit, oven unit 1 to 3)” in <Low pressure in the pressurized enclosure>.
(6) When the internal pressure in the oven unit 1 to 3 exceeds 392 (Pa), purging to the oven unit begins.
(7) After 9 ±2.5 minutes the purging, power is applied to the electronics section of the oven unit. Then the hydrogen limiting unit, the heater and detector in the oven are ready for operation.

<Power off>

(1) The operation and the supply of sample to be measured are stopped.
(2) The detector is turned off.
In case of FID, FID with methanizer and FPD, the detector should be “Frame out” with stopping the supply of make-up gas, combustion gas and combustion air. Then, wait for over 4 hours.
(3) Each heater of the isothermal oven (or programmed temperature oven), LSV and FPD is turned off.
(4) Wait until the oven temperature drops to near room temperature. Usually it takes over one hour.
(5) The supply of power to the protection system is stopped.
(6) After the oven temperature drops, the supply of the protective gas (instrumental air) is stopped.

IMPORTANT

In case of emergency, stop the supply of power immediately. In this case, it may damage to the analyzer.

<Low pressure in the pressureized enclosure>

A. Electronics section (control unit, oven unit 1 to 3)

When the internal pressure in the electronics section falls below 392 (Pa), the following function is activated.

The power supply is not shut off automatically. It should be done manually.

- The alarm is outputted from the contact output.
- The pressure low alarm is indicated on the operation panel.
- The “ALARM” LED is turned on.

B. Each isothermal oven (or programmed temperature oven) in the oven unit 1 to 3

When the internal pressure in any of the ovens falls below 392 (Pa), the control unit immediately shuts off the power supply to the heater and detector in the respective ovens.

The function as follows is also activated at the same time.

- The alarm is outputted from the contact output.
- The pressure low alarm is indicated on the operation panel.
- The “ALARM” LED is turned on.

When the internal pressure in the oven returns to normal, the procedure starts automatically from item (7) in <Power on>.

Safety Instructions

This content described as follows is only for ATEX, IECEx and NEPSI.

● Specification of safety system

		Protection system	Oven safety unit
Power supply		Install in accordance with the specification of GC8000	
Ambient condition			
Threshold value	Pressure	392 Pa	
	Flow rate of protection gas	35 L/min	
Time	Purging time	21 ±3 min	11 ±3 min
	Safety response time	< 2 sec	
Safety characteristics	HFT (*1)	1	
	SIL (*2)	2	
	Proof test interval	No needed	At least once within 3 years
	Replacement interval (*3)	At least once within 12 years	At least once within 27 years
Type of protection	Protection system itself	Ex d	Ex px
	Protection target	Ex px	

(*1) HFT: hardware Fault Tolerance
(*2) SIL: Safety Integrity Level
(*3) This interval is the longest period to maintain explosion proof function and does not mean that the system is under warranty during the interval.

● Installation and wiring works

The safety system is built-in GC8000. Installation and wiring into GC8000 are completed before shipping.

- Do not use for other than GC8000.
- Do not change connection of cables and harnesses.

● Action in Emergency

Relays and SSRs in safety system will be in safe state (contact opens) when de-energized.

In emergency, stop supply of power to GC8000 immediately and contact your nearest Yokogawa representative.

- In a normal situation, follow the procedure of "● Operation" for shutdown, or GC8000 may be damaged.

● Regular proof test

In order to maintain the safety function, proof test at least once while test period below is necessary. Contact your nearest Yokogawa representative.

If proof test is not performed for longer than test interval, GC8000 cannot be used as explosion proof equipment.

	Protection system	Oven safety unit
Test interval	No needed	3 years

● Replacement

In following case, stop supply of power to GC8000 immediately and replace the safety system.

- Safety function does not work correctly.
- Safety system is used over replacement interval.

Replacement is needed even if all safety functions work correctly.

Contact your nearest Yokogawa representative.

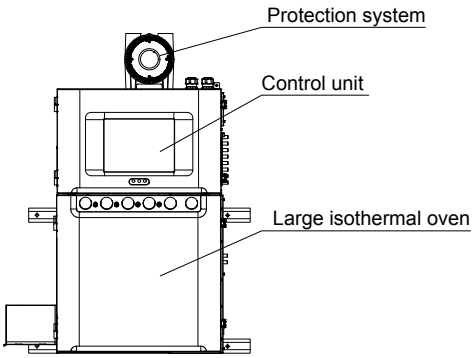
	Protection system	Oven safety unit
Replacement interval	12 years	27 years

1. Overview

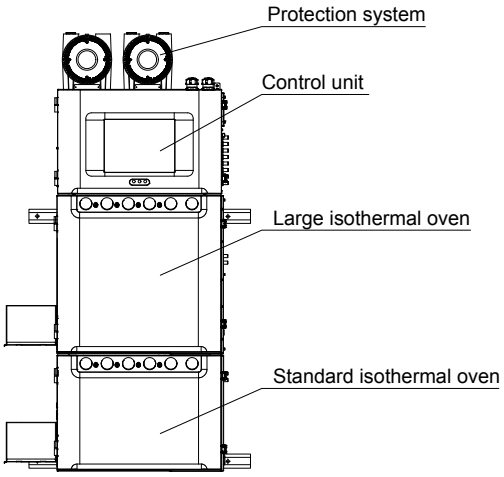
This document is an excerpted version of the GC8000 User's Manual for the customer's convenience.

See also Operation Data for installation work and operation.

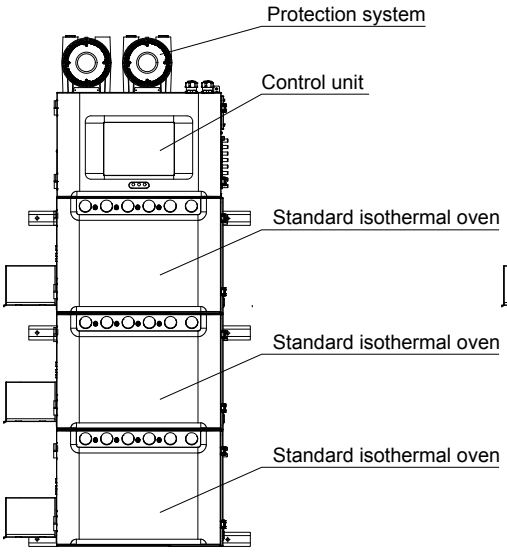
Three types of GC8000 are available (Type 1 to 4). And each type has a wall-mounting version and a self-standing version.



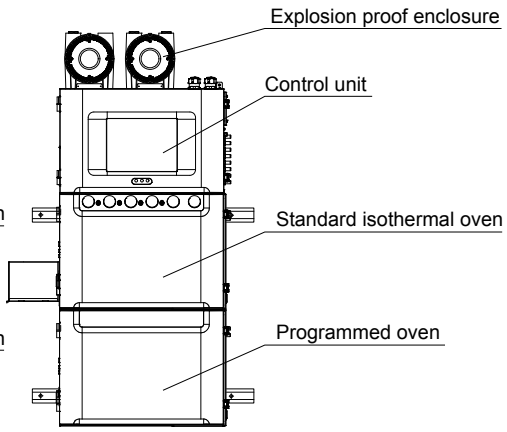
Type 1 (Wall-mounting)



Type 2 (Wall-mounting)



Type 3 (Wall-mounting)



Type 4 (Wall-mounting)

* The self-standing type is equipped with a GCSMP (excluding Type 3). External sampling systems can be connected as needed.

Figure 1.1 GC8000 configuration example

System configuration

The following equipment is used to construct a process gas chromatograph system with the GC8000 analyzer:

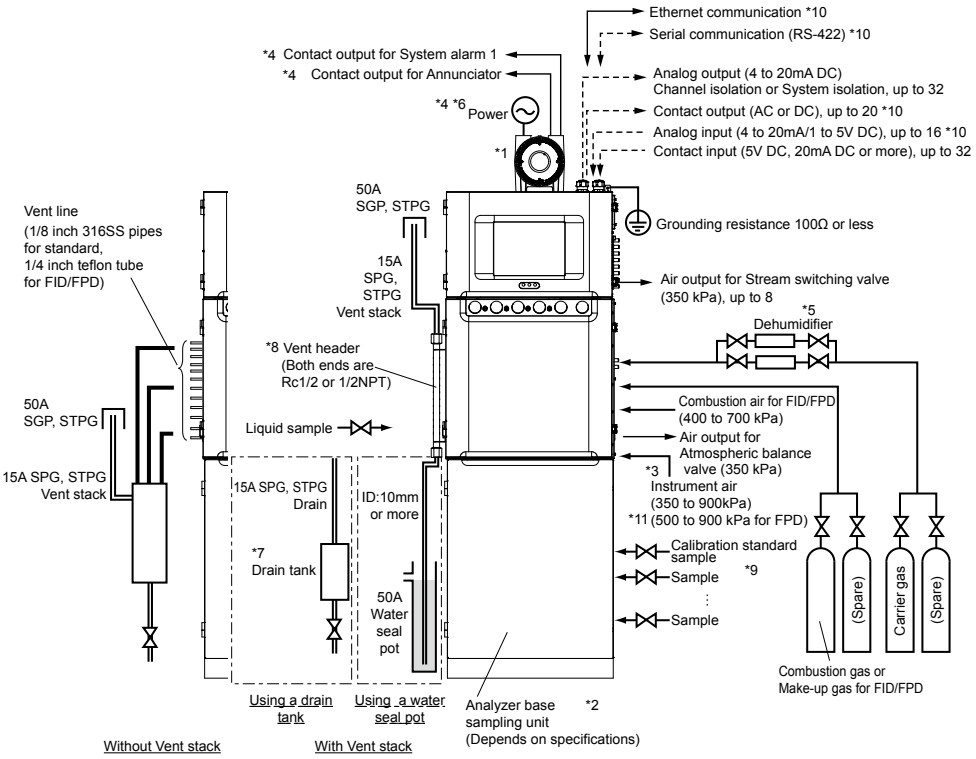
- External sample conditioning equipment

- Personal computer
- Computer for upper system, Analog equipment
- Analyzer network system

The system configuration may differ according to the specifications.

See the General Specifications for details.

1.1 Wiring and Piping Diagram



*1: The specification determines the number of Explosion proof enclosures. No enclosures is needed for FM-Y, CSA-Y type.

*2: If an analyzer base sampling unit is provided, most applications require no external sampling equipment. In addition, optimum sampling systems are prepared depending on various conditions. (For details, consult Yokogawa. Optimal sampling systems will be offered.)

*3: For air purge piping, use stainless steel pipe of 1/2 inch or more.

*4: Power and contact output for system alarm 1 or annunciator are connected to control unit in case of FM-Y, CSA-Y type.

*5: Dehumidifier can be optionally provided by Yokogawa. Other wiring cables, piping and installation materials should be supplied by the user.

*6: Circuit breaker (30 AT or less) shall be suitable for the item of the power supply described in the specification, and located near the analyzer.

*7: Drain tank is needed only for GCs using FID/FPD. This is not used for GCs using TCD.

*8: Fix venting pipes properly so that the load of the venting pipes does not apply to the assembling vents of this analyzer.

*9: The number of streams including one for calibration standard sample is as follows, in case of using GCSMP.
Type 1: Maximum of 7
Type 2, 4: Maximum of 4

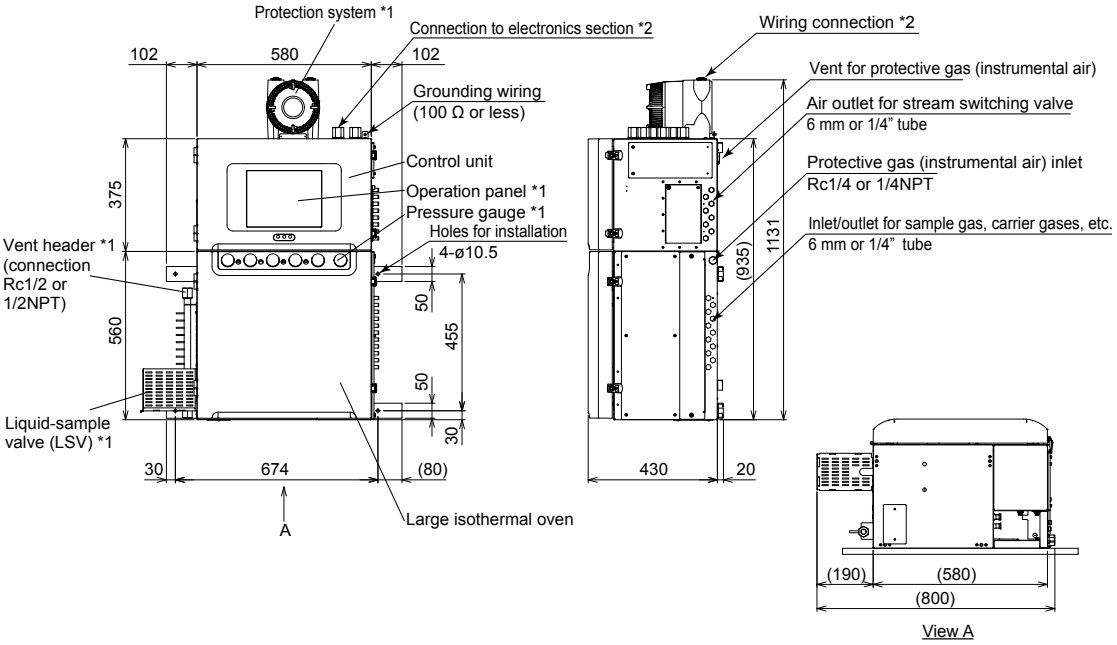
*10: Signal interrupters (disconnecters) are required depending on the specification.

*11: Air pressure set value of the regulator is depended on the source air temperature and need to tune the setting value.

1.2 External Dimensions

Type 1 (Wall-mounting)

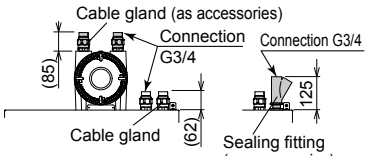
Unit: mm



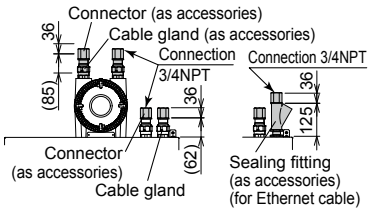
Weight: approx. 100 kg

*1: It depends on specifications.
*2: Wiring connections are shown in right figures.

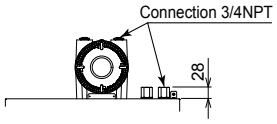
For TIIS (wiring connection: G3/4)



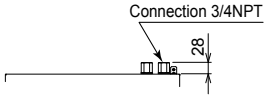
For TIIS (wiring connection: 3/4NPT)



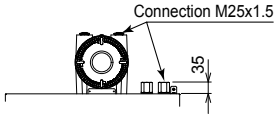
For FM-X, CSA-X (wiring connection: 3/4NPT)



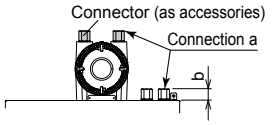
For FM-Y, CSA-Y (wiring connection: 3/4NPT)



For ATEX, IECEx, NEPSI (wiring connection: M25x1.5)

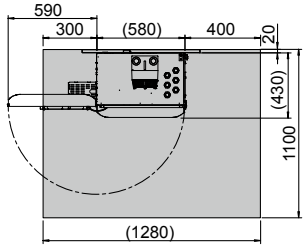


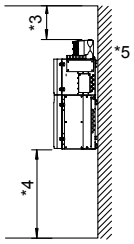
For ATEX, IECEx, NEPSI (wiring connection: G3/4 or 3/4NPT)



Wiring connection	a	b
G3/4		31
3/4NPT		29

<Maintenance space>

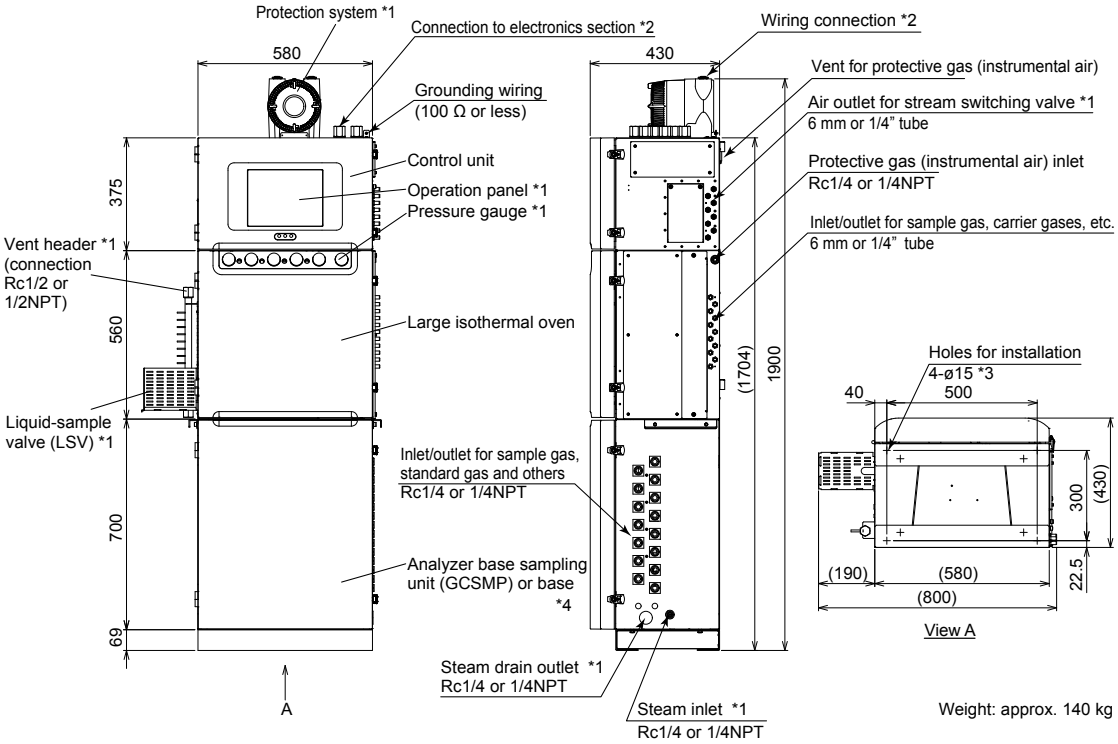




*3: Required clearance needed for wiring.
*4: It is recommended to mount at approx. 800 mm above the floor for easy operation or maintenance.
*5: The wall construction for mounting has to be designed for 4 times the weight of the analyzer.

Type 1 (Self-standing)

Unit: mm

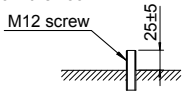


Weight: approx. 140 kg

*1: It depends on specifications.

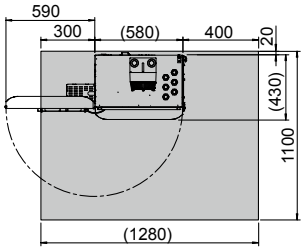
*2: Wiring connections are shown in right figures.

*3: The four outer holes are used for installation.
The height of M12 screw (prepared by user) is 25 ±5 mm from the floor.

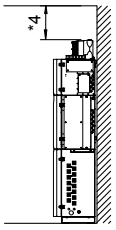


*4: The empty compartment (base) placed by Yokogawa to create a Self-standing GC8000-A, does not impair the compliance of the GC8000-A.

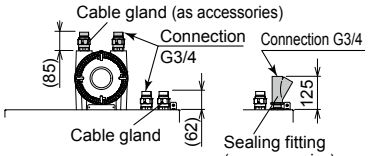
<Maintenance space>



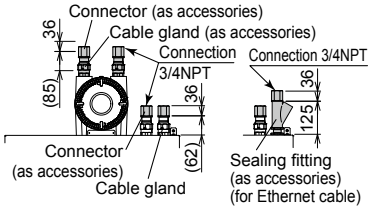
*5: Required clearance needed for wiring.



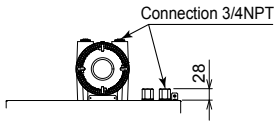
For TIIS (wiring connection: G3/4)



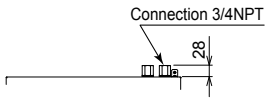
For TIIS (wiring connection: 3/4NPT)



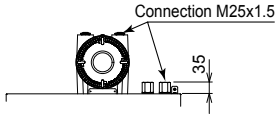
For FM-X, CSA-X (wiring connection: 3/4NPT)



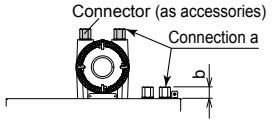
For FM-Y, CSA-Y (wiring connection: 3/4NPT)



For ATEX, IECEx, NEPSI (wiring connection: M25x1.5)



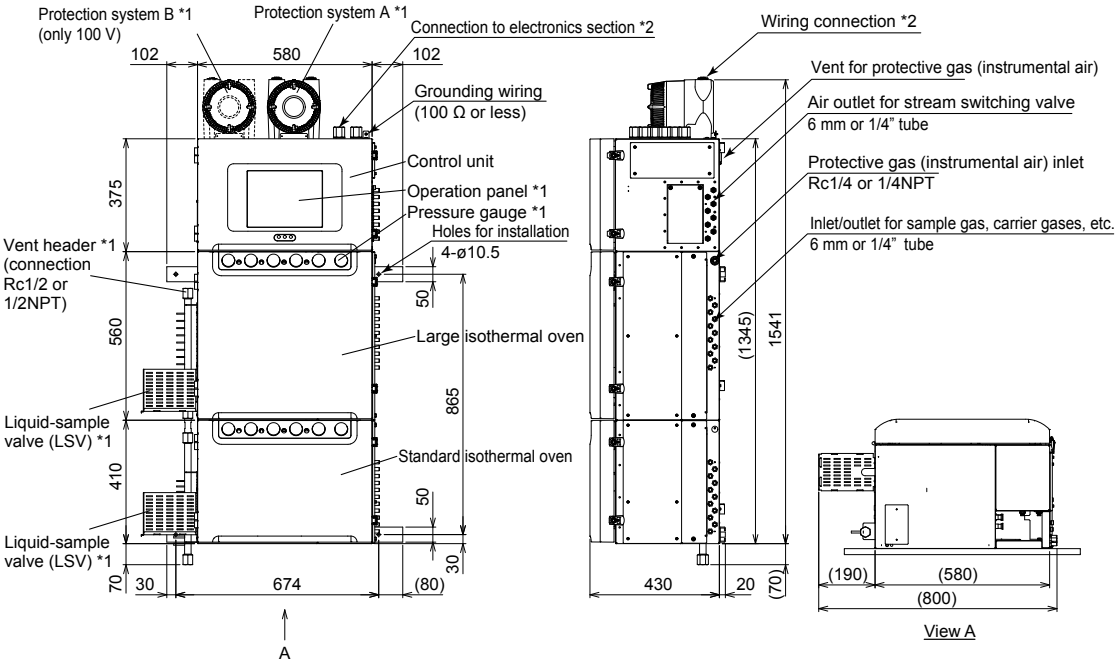
For ATEX, IECEx, NEPSI (wiring connection: G3/4 or 3/4NPT)



Wiring connection	a	b
G3/4		31
3/4NPT		29

Type 2 (Wall-mounting)

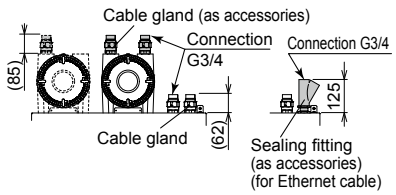
Unit: mm



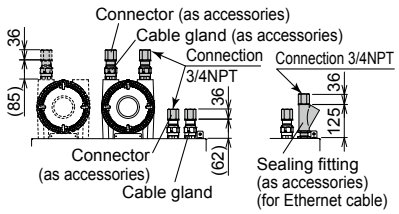
Weight: approx. 155 kg

*1: It depends on specifications.
*2: Wiring connections are shown in right figures.

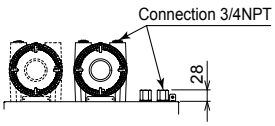
For TIIS (wiring connection: G3/4)



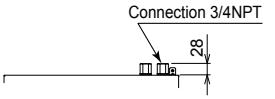
For TIIS (wiring connection: 3/4NPT)



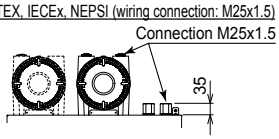
For FM-X, CSA-X (wiring connection: 3/4NPT)



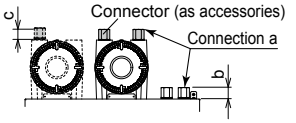
For FM-Y, CSA-Y (wiring connection: 3/4NPT)



For ATEX, IECEx, NEPSI (wiring connection: M25x1.5)

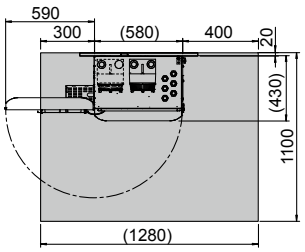


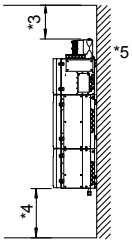
For ATEX, IECEx, NEPSI (wiring connection: G3/4 or 3/4NPT)



Wiring connection	a	b	c
G3/4	31	30	
3/4NPT	29	28	

<Maintenance space>

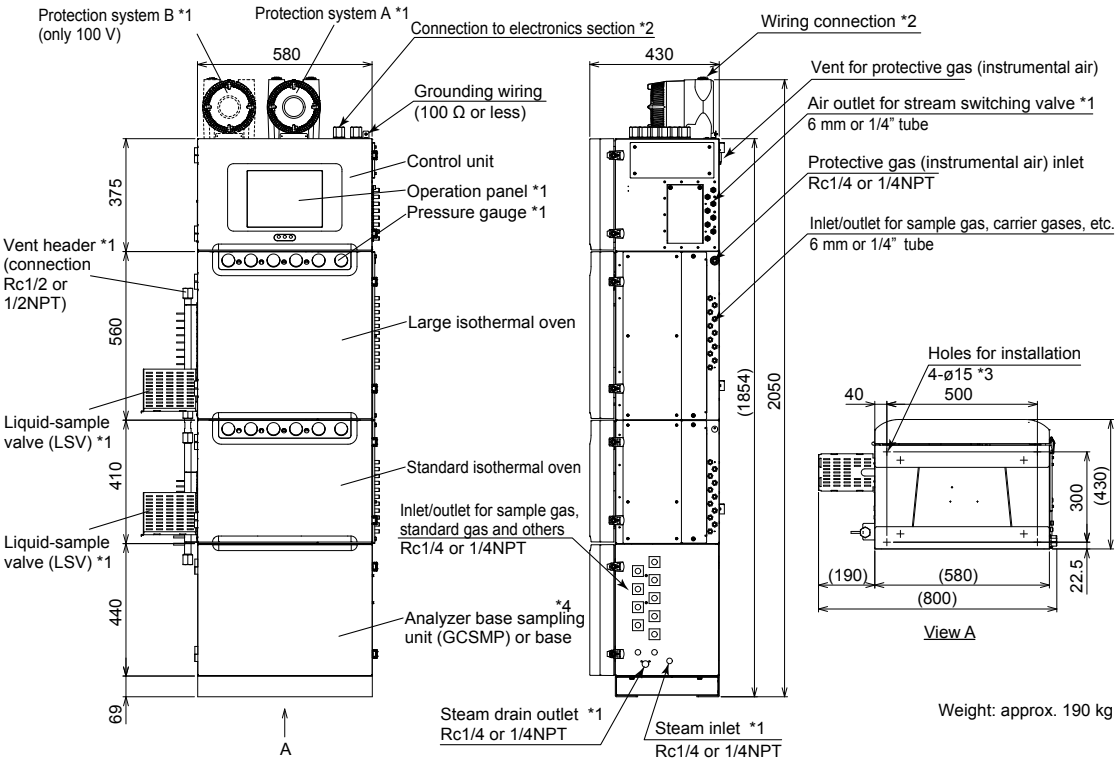




*3: Required clearance needed for wiring.
*4: It is recommended to mount at approx. 500 mm above the floor for easy operation or maintenance.
*5: The wall construction for mounting has to be designed for 4 times the weight of the analyzer.

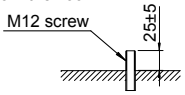
Type 2 (Self-standing)

Unit: mm



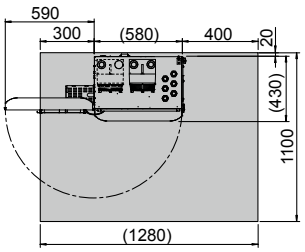
Weight: approx. 190 kg

*1: It depends on specifications.
*2: Wiring connections are shown in right figures.
*3: The four outer holes are used for installation.
The height of M12 screw (prepared by user) is 25 ±5 mm from the floor.

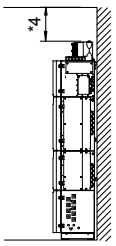


*4: The empty compartment (base) placed by Yokogawa to create a Self-standing GC8000-A, does not impair the compliance of the GC8000-A.

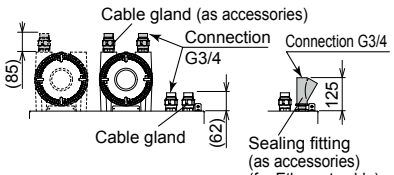
<Maintenance space>



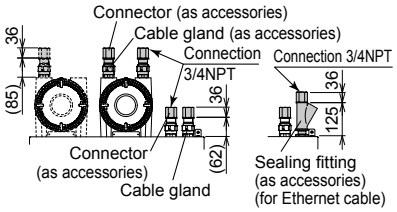
*5: Required clearance needed for wiring.



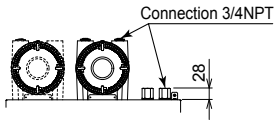
For TIIS (wiring connection: G3/4)



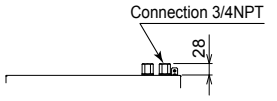
For TIIS (wiring connection: 3/4NPT)



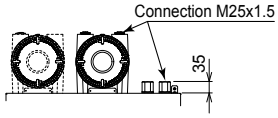
For FM-X, CSA-X (wiring connection: 3/4NPT)



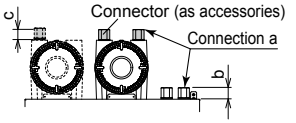
For FM-Y, CSA-Y (wiring connection: 3/4NPT)



For ATEX, IECEx, NEPSI (wiring connection: M25x1.5)



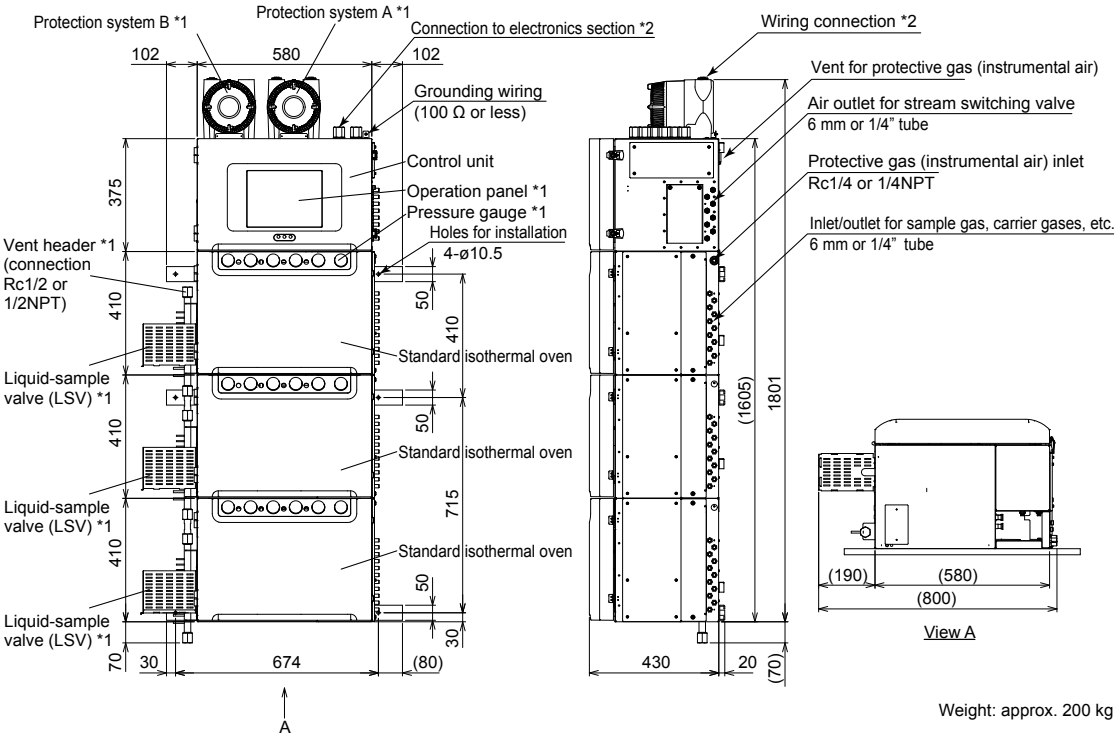
For ATEX, IECEx, NEPSI (wiring connection: G3/4 or 3/4NPT)



Wiring connection	a	b	c
G3/4	31	30	
3/4NPT	29	28	

Type 3 (Wall-mounting)

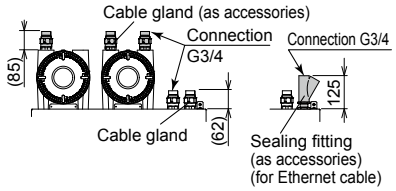
Unit: mm



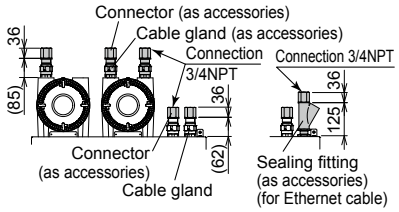
Weight: approx. 200 kg

*1: It depends on specifications.
*2: Wiring connections are shown in right figures.

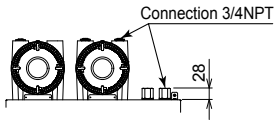
For TIIS (wiring connection: G3/4)



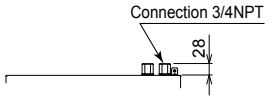
For TIIS (wiring connection: 3/4NPT)



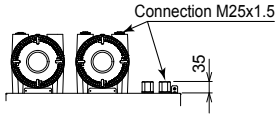
For FM-X, CSA-X (wiring connection: 3/4NPT)



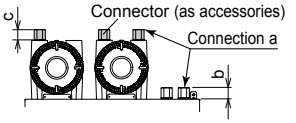
For FM-Y, CSA-Y (wiring connection: 3/4NPT)



For ATEX, IECEx, NEPSI (wiring connection: M25x1.5)

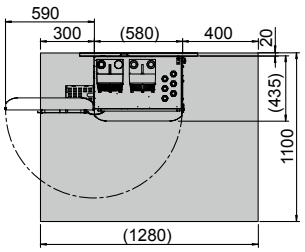


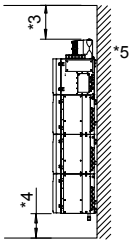
For ATEX, IECEx, NEPSI (wiring connection: G3/4 or 3/4NPT)



Wiring connection	a	b	c
G3/4	31	30	
3/4NPT	29	28	

<Maintenance space>

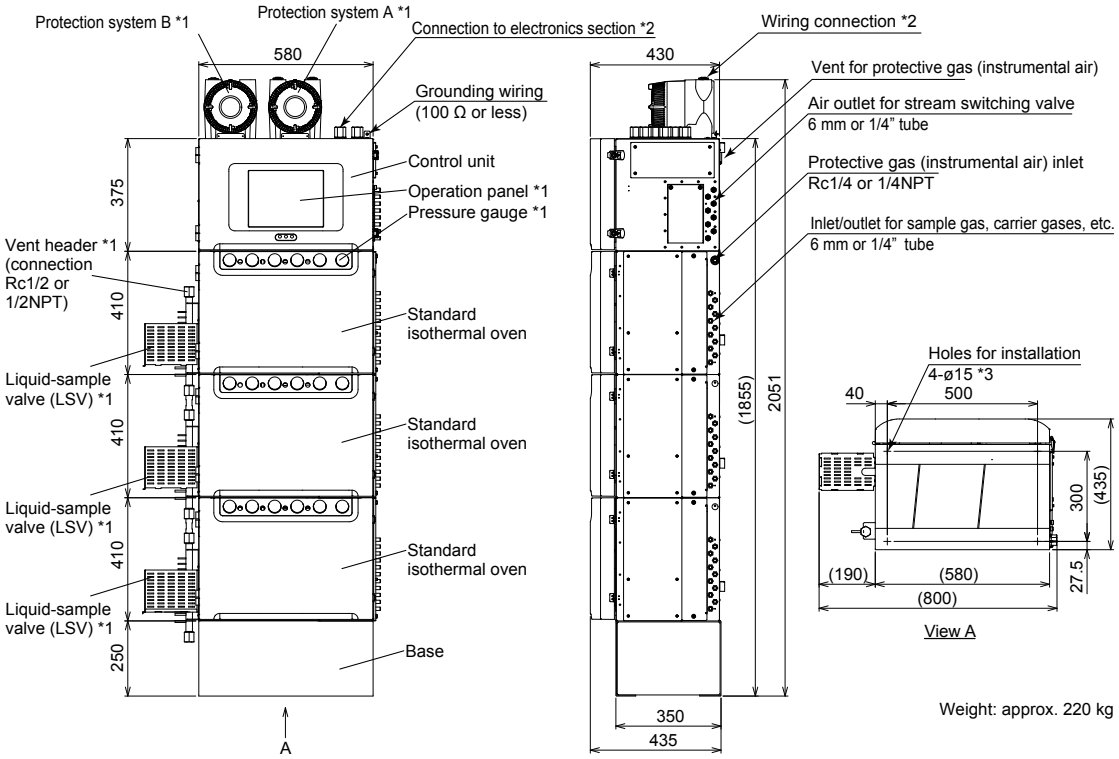




*3: Required clearance needed for wiring.
*4: It is recommended to mount at approx. 250 mm above the floor for easy operation or maintenance.
*5: The wall construction for mounting has to be designed for 4 times the weight of the analyzer.

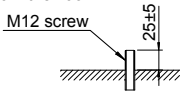
Type 3 (Self-standing)

Unit: mm

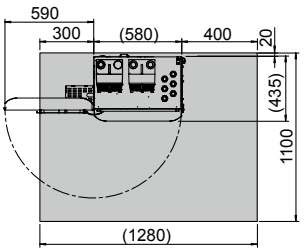


Weight: approx. 220 kg

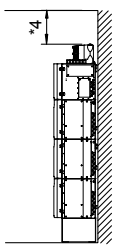
*1: It depends on specifications.
*2: Wiring connections are shown in right figures.
*3: The four outer holes are used for installation.
The height of M12 screw (prepared by user) is 25 ±5 mm from the floor.



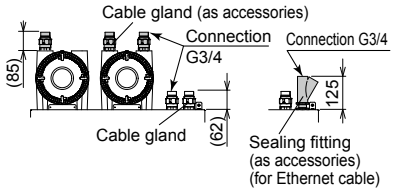
<Maintenance space>



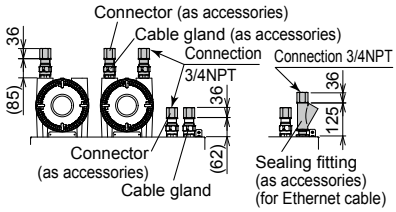
*4: Required clearance needed for wiring.



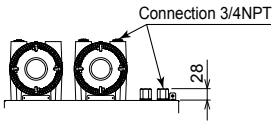
For TIIS (wiring connection: G3/4)



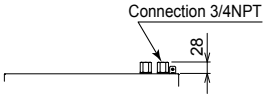
For TIIS (wiring connection: 3/4NPT)



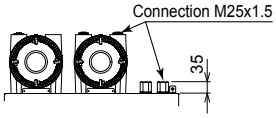
For FM-X, CSA-X (wiring connection: 3/4NPT)



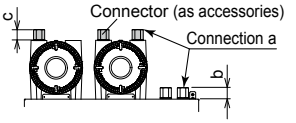
For FM-Y, CSA-Y (wiring connection: 3/4NPT)



For ATEX, IECEx, NEPSI (wiring connection: M25x1.5)



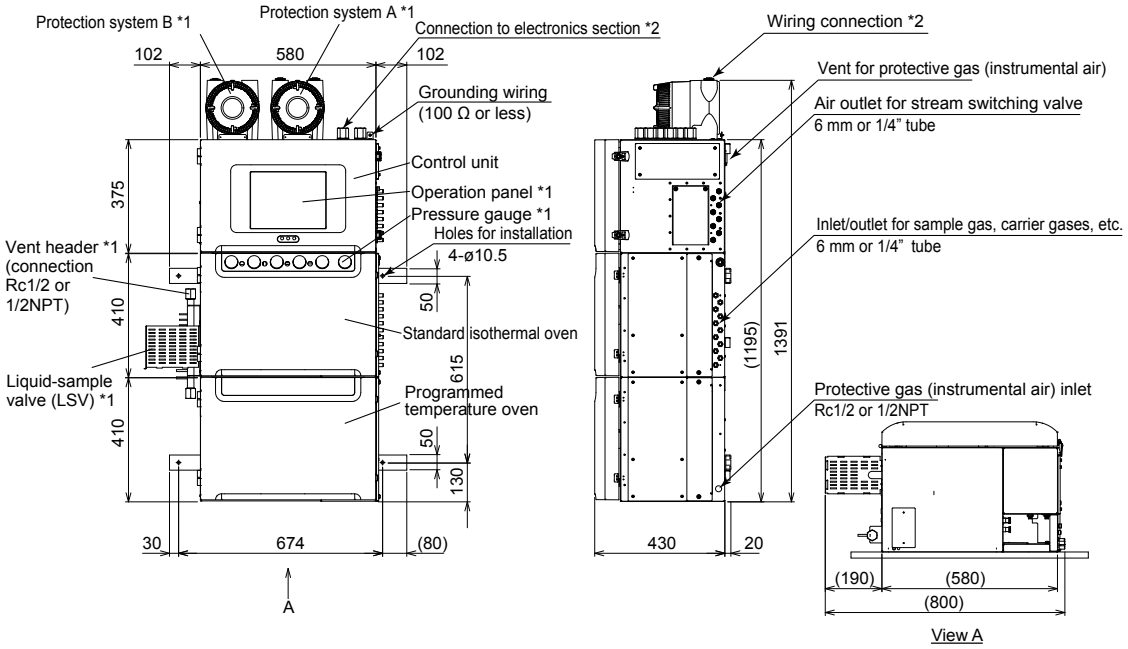
For ATEX, IECEx, NEPSI (wiring connection: G3/4 or 3/4NPT)



Wiring connection	a	b	c
G3/4	31	30	
3/4NPT	29	28	

Type 4 (Wall-mounting)

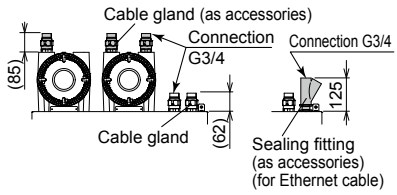
Unit: mm



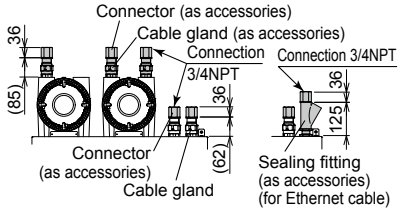
Weight: approx. 140 kg

*1: It depends on specifications.
*2: Wiring connections are shown in right figures.

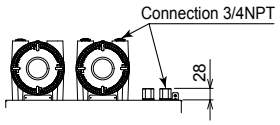
For TIIS (wiring connection: G3/4)



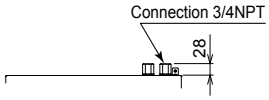
For TIIS (wiring connection: 3/4NPT)



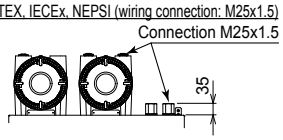
For FM-X, CSA-X (wiring connection: 3/4NPT)



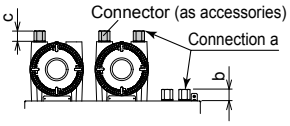
For FM-Y, CSA-Y (wiring connection: 3/4NPT)



For ATEX, IECEx, NEPSI (wiring connection: M25x1.5)

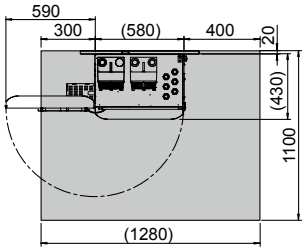


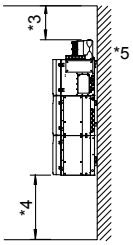
For ATEX, IECEx, NEPSI (wiring connection: G3/4 or 3/4NPT)



Wiring connection	a	b	c
G3/4		31	30
3/4NPT		29	28

<Maintenance space>

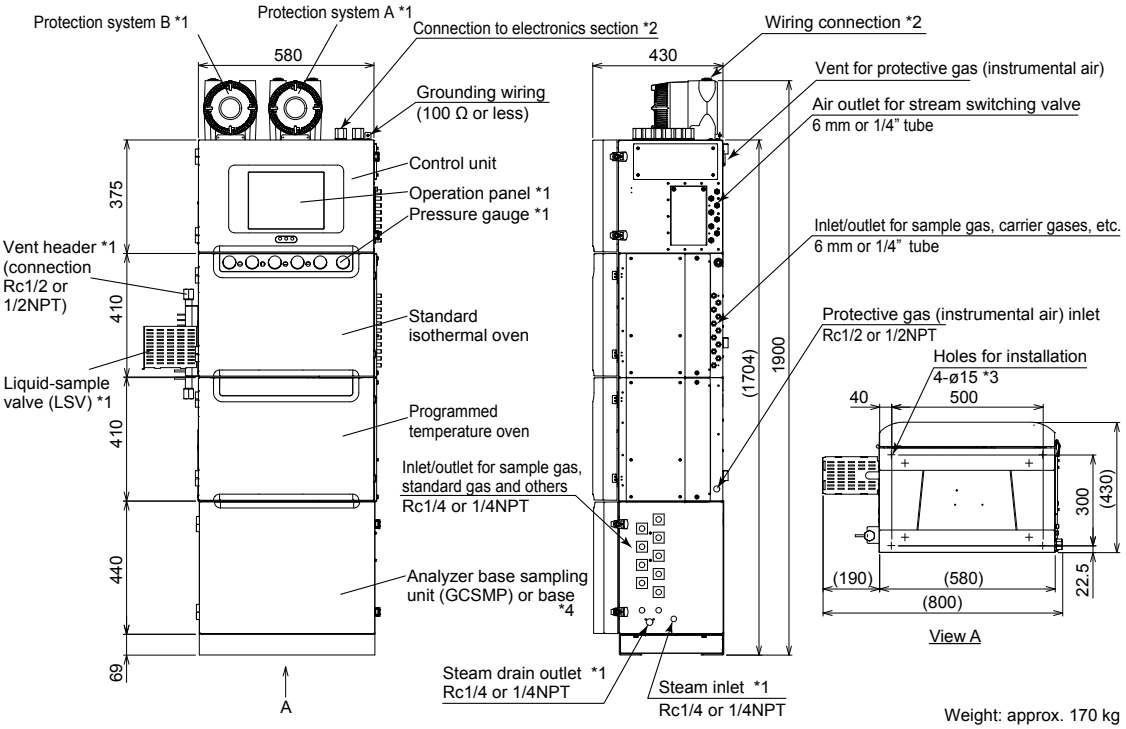




*3: Required clearance needed for wiring.
*4: It is recommended to mount at approx. 500 mm above the floor for easy operation or maintenance.
*5: The wall construction for mounting has to be designed for 4 times the weight of the analyzer.

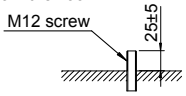
Type 4 (Self-standing)

Unit: mm



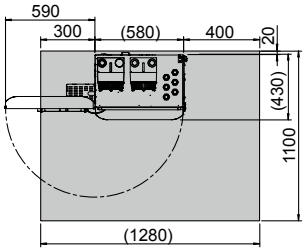
Weight: approx. 170 kg

*1: It depends on specifications.
*2: Wiring connections are shown in right figures.
*3: The four outer holes are used for installation.
The height of M12 screw (prepared by user) is 25 ±5 mm from the floor.



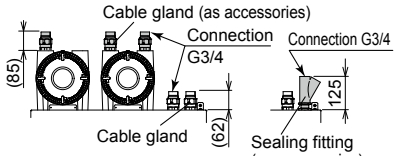
*4: The empty compartment (base) placed by Yokogawa to create a Self-standing GC8000-A, does not impair the compliance of the GC8000-A.

<Maintenance space>

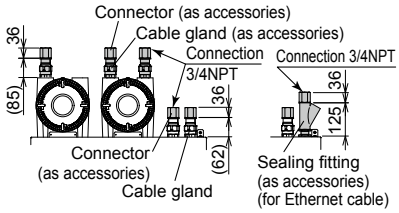


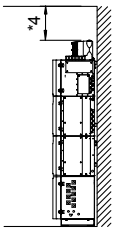
*5: Required clearance needed for wiring.

For TIIS (wiring connection: G3/4)

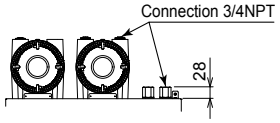


For TIIS (wiring connection: 3/4NPT)

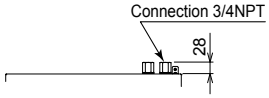




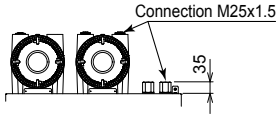
For FM-X, CSA-X (wiring connection: 3/4NPT)



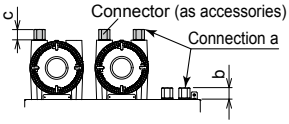
For FM-Y, CSA-Y (wiring connection: 3/4NPT)



For ATEX, IECEx, NEPSI (wiring connection: M25x1.5)



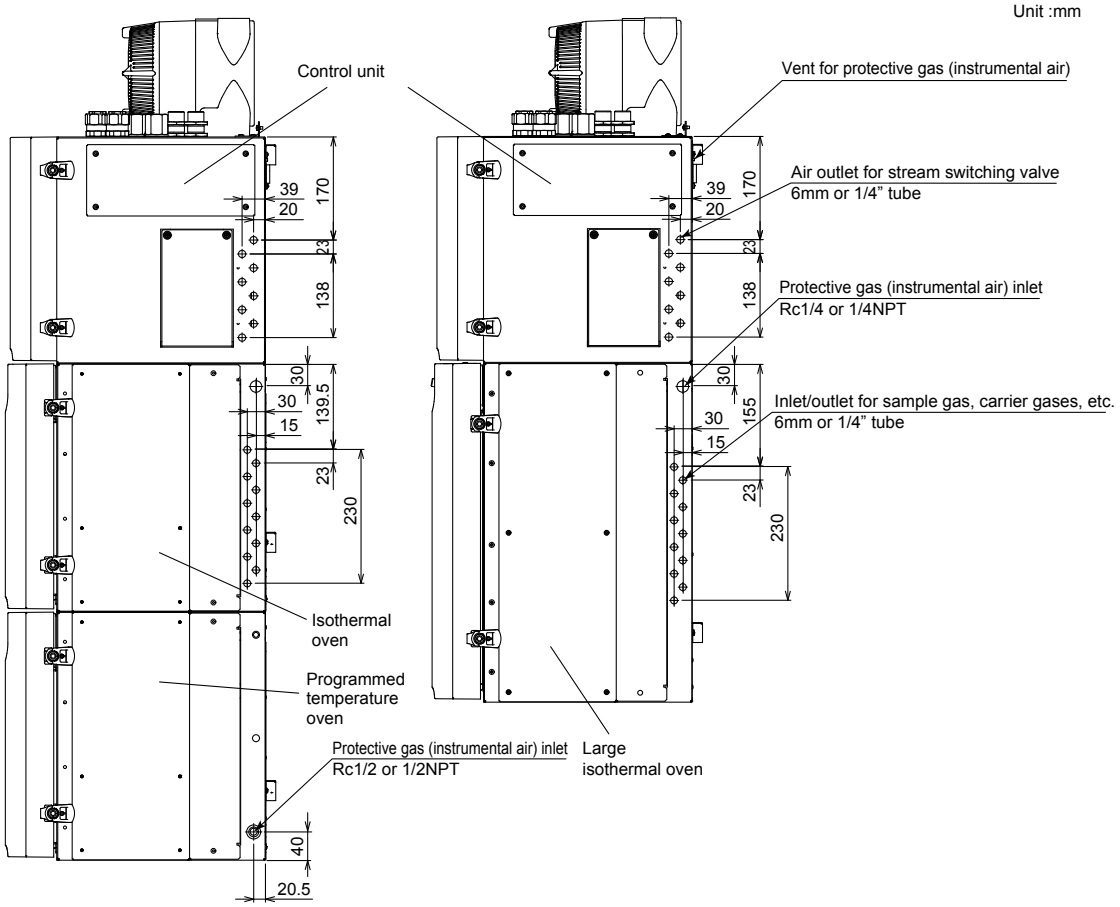
For ATEX, IECEx, NEPSI (wiring connection: G3/4 or 3/4NPT)



Wiring connection	a	b	c
G3/4		31	30
3/4NPT		29	28

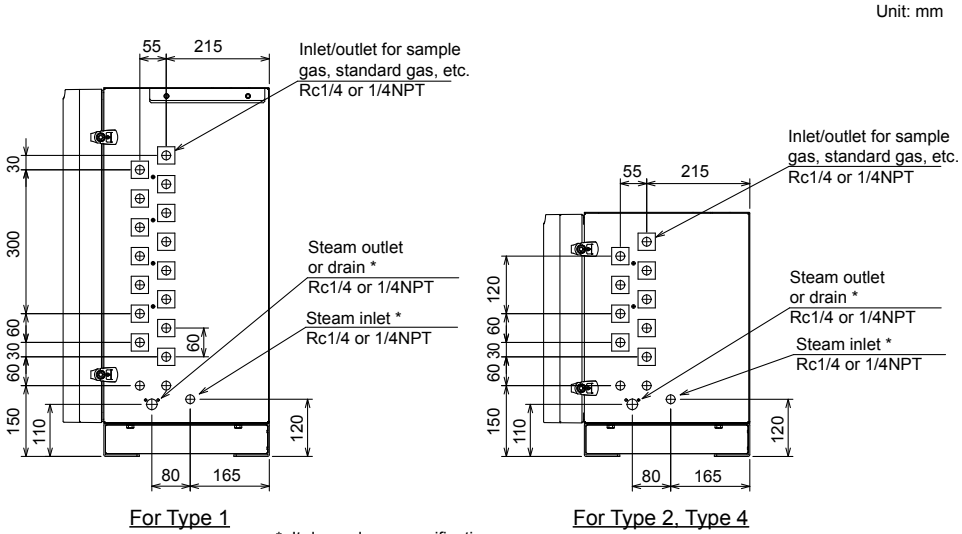
Piping connection of control unit, isothermal oven, large isothermal oven, and programmed temperature oven

Unit :mm



Analyzer base sampling system (GCSMP)

Unit: mm



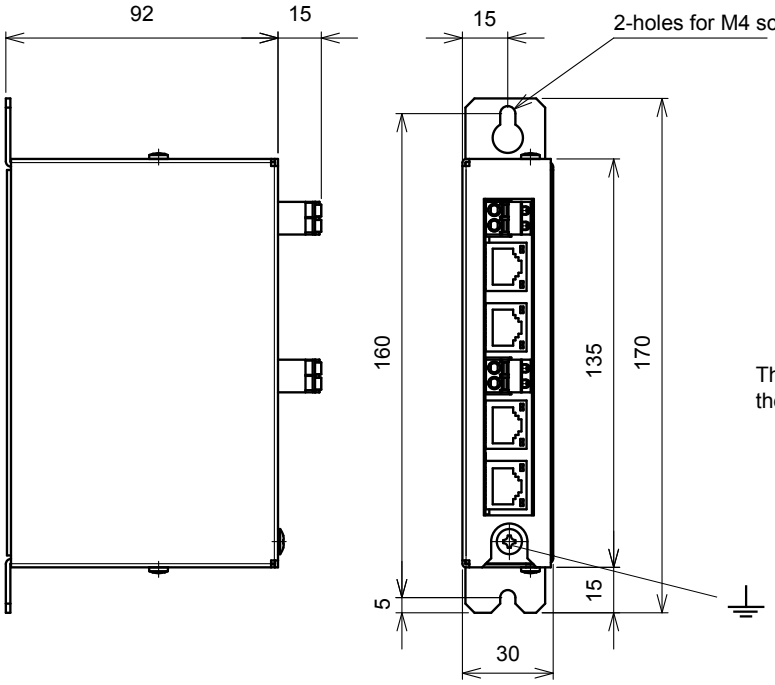
*: It depends on specifications.

* Some specifications do not have these connections.

Communication converter/Signal interrupter (disconnecter)

Rack-mounted type

- **Converter for RS-422/RS-232C: K9806AS***
- **Signal interrupter for Ethernet twisted pair cable: K9806AA**
- **Signal interrupter for RS-422 output, analog input: K9806AE**

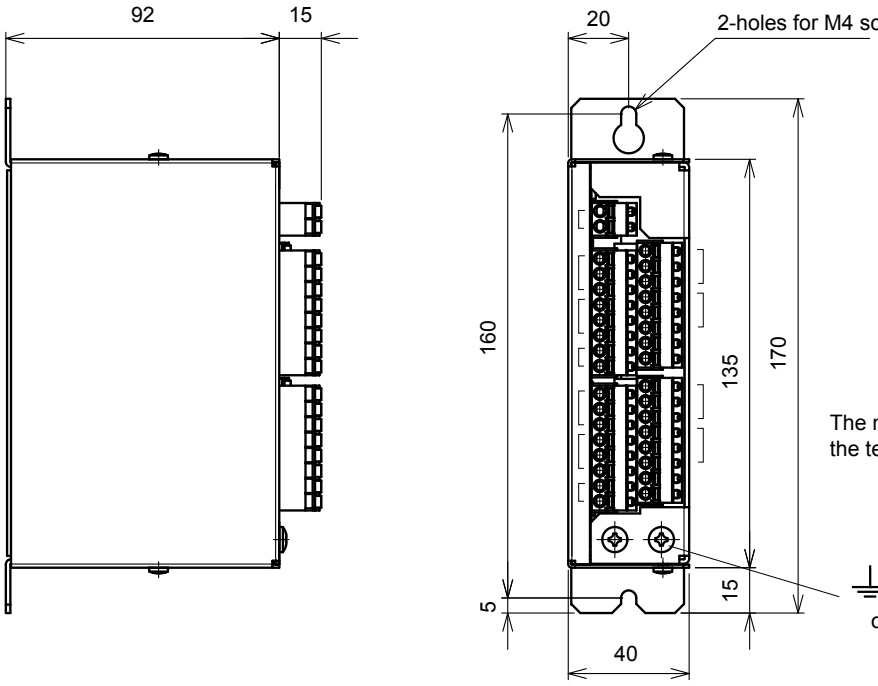


Unit: mm

The number and the location of
the terminals depend on its part number.

Weight: approx. 500 g

- **Signal interrupter for contact output (AC): K9806AN***
- **Signal interrupter for contact output (DC): K9806AJ***



Unit: mm

The number and the location of
the terminals depend on its part number.

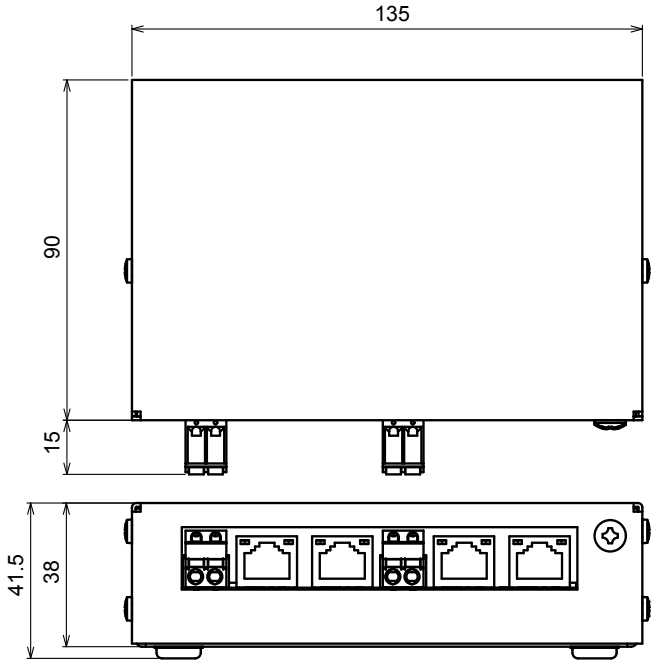
K9806AN: Protective earth

Weight: approx. 500 g

Note: Rack-mounted type should be installed vertically. The space between the converters/the signal interrupters with mark (*) should be kept more than 10 mm.
The wall construction for mounting has to be designed for 4 times the weight of the product.

Desk-top type

- **Converter for RS-422/RS-232C: K9806AT**
- **Signal interrupter for Ethernet twisted pair cable: K9806AB**



Unit: mm

The number and the location of
the terminals depend on its part number.

Weight: approx. 500 g

Note: Desk-top type should be installed horizontally.

1.3 Auxiliary Hardware

(1) Cylinders (carrier gas, standard gases, etc.)

These cylinders are filled with a carrier gas or standard gas.

The maximum filling pressure is limited to 15 MPa considering the strength of the cylinders.

(2) Regulator for cylinder

This valve reduces a cylinder pressure to a safe degree to facilitate handling. The valve is directly mounted to the cylinder.

(3) Stop valve

This valve shuts down the lines for the sample gas, instrument gas, and so on. It is operated manually.

(4) Dehumidifier

Any moisture in the carrier gas affects the columns. Therefore, if the carrier gas contains moisture over 10 ppm, it is recommended to use a desiccant, such as a molecular sieve, to prevent deterioration of the columns.

(5) Vent stacks

These are pipes to discharge sample bypass vent, sample vent, backflush vent, foreflush vent, detector vent, measurement gas vent, and others to the atmosphere collectively.

Direct the exhaust gas to an area where the gas sufficiently disperses and diffuses before discharging.

(6) Regulator for sample

This valve reduces the sample pressure to a specified degree.

To vaporize a liquid sample, use a regulator with a steam-heated vaporizer.

(7) Pipings

The pipes for the sample inlet, carrier gas inlet, standard gas inlet, air for valve driving, air for FID/FPD, FID/FPD hydrogen, steam, sampling bypass, and various vents are provided.

(8) Joints

The joints are used to connect pipes.

1.4 Gases Required for Operation

The following gases are required for the analyzer:

(1) Sample gas

The gas to be analyzed from the process line

(2) Carrier gas

Prepare a gas cylinder for the carrier gas. Keep spare cylinders at hand, too.

If two different carrier gases are used, two gas cylinders are needed.

The gas must satisfy the following conditions. (Gas with higher purity may be required depending on the specifications. See the delivery specifications for details.)

Purity: Measuring range from 0 to 50 ppm or more: 99.99% minimum
Moisture: 10 ppm or less; organic components: 5 ppm or less
Measuring range from 0 to less than 50 ppm: 99.999% minimum
Moisture: 5 ppm or less; organic components: 0.1 ppm or less

(3) Standard gas

This gas is used for calibration. Prepare a gas cylinder including measurement component.

Since up to three different standard gases can be used for automatic calibration, prepare gas cylinders suitable for calibration.

(4) FID/FPD combustion hydrogen gas

Hydrogen gas is necessary when either FID or FPD is used as a detector. Prepare pure hydrogen gas in a cylinder, and keep spare cylinders at hand.

The gas must satisfy the following conditions. (Gas with higher purity may be required depending on the specifications. See the delivery specifications for details.)

Purity: Measuring range from 0 to 50 ppm or more: 99.99% minimum
Moisture: 10 ppm or less; organic components: 5 ppm or less
Measuring range from 0 to less than 50 ppm: 99.999% minimum
Moisture: 5 ppm or less; organic components: 0.1 ppm or less

(5) Instrument air

This air is used for valve actuation and purging.

Pressure: 350 to 900 kPa
500 to 900 kPa (with FPD)
350 to 900 kPa (Programmed temperature oven without cooler)
500 to 900 kPa (Programmed temperature oven with cooler)

Maximum flowrate: Type 1: 140 L/min
Type 1 with FPD: 440 L/min
Type 2: 210 L/min
Type 2 with FPD: 510 L/min
Type 3: 280 L/min
Type 4: Depend on the specification
210 L/min or more (Without cooler and immediate cooling function)
600 L/min or more (Without cooler with immediate cooling function)
510 L/min or more (With cooler without immediate cooling function)
510 L/min or more (With cooler and immediate cooling function)

Oil: 5 ppm or less

Cleanliness: Must be free from dust, corrosive elements, and toxic elements.

(6) FID/FPD combustion air

This air is used to burn hydrogen gas in an FID or FPD.

The air must satisfy the following conditions.

Purity: Measuring range from 0 to 50 ppm or more: moisture: 10 ppm or less; organic components: 5 ppm or less

Measuring range from 0 to less than 50 ppm: moisture: 5 ppm or less; organic components: 0.1 ppm or less

(7) Steam

Steam is required to steam-heat a sample. Prepare a steam source that can apply the pressure listed in “Operation Data.”

1.5 Conformance Standards

Safety Standard and EMC Standard are showned in the following list.

Ex Certification	MS code	Safety Standard	EMC standard
TIIS	GC8000-T	-	-
	GC8000-T /KC	EN 61010-1 EN 61010-2-030	EN 61326-1 Class A, Table 2 (For use in industrial locations) EN 61326-2-3 Korea Electromagnetic Conformity Standard RCM (C-Tick) Mark
ATEX *1	GC8000-A		
IECEx	GC8000-E		
NEPSI *2	GC8000-P		
FM	GC8000-F GC8000-G	FM 3810: 2005 (ANSI/ISA 61010-1-2004 (82.02.01), ANSI/ISA-82.02.02-1996 (IEC 61010-2-031))	-
CSA	GC8000-C GC8000-D	CSA C22.2 No. 61010-1-04	-

*1: Analyzer base sampling unit (GCSMP) or base placed under GC8000-A is not covered by the EU-DoC nor the EC Type-examination Certificate. The empty compartment (base) placed by Yokogawa to create a Self-standing GC8000-A, does not impair the compliance of the GC8000-A.

*2: The design is based on the safety and EMC standard, though the mark of CE, KC and RCM (C-Tick) is not indicated.

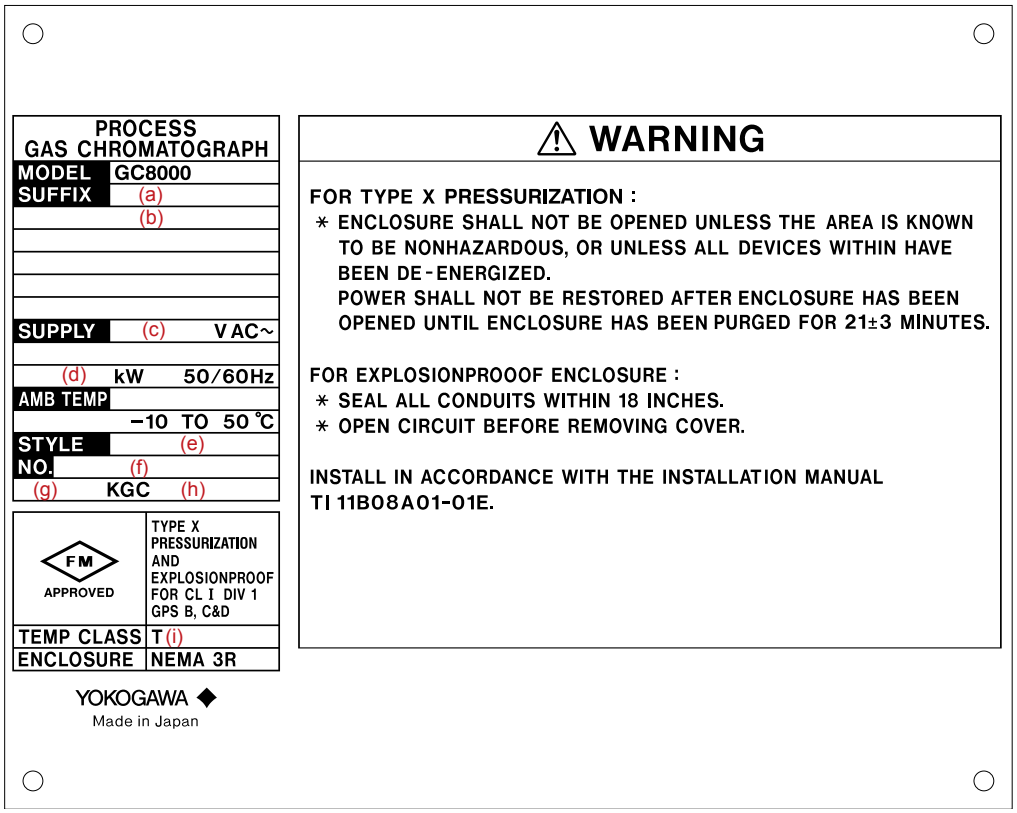
CAUTION

This instrument is a Class A product, and is designed for use in an industrial environment. Please use this instrument in an industrial environment only.

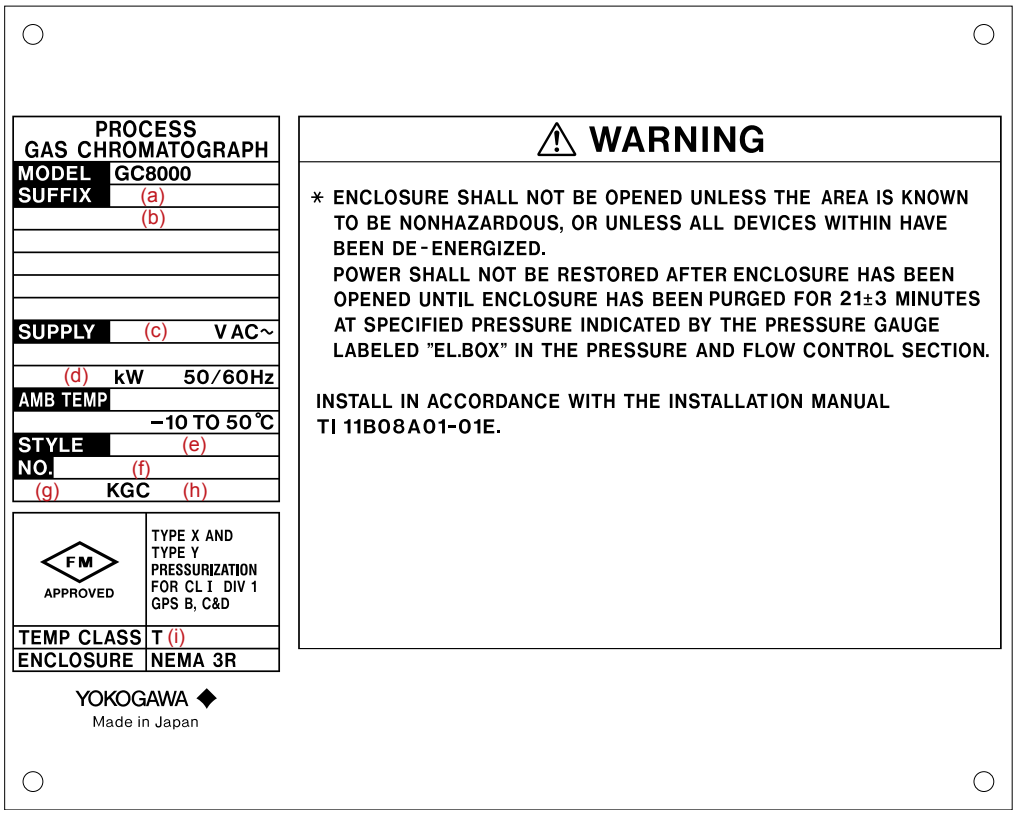
1.6 Data Plate

FM

FM-X



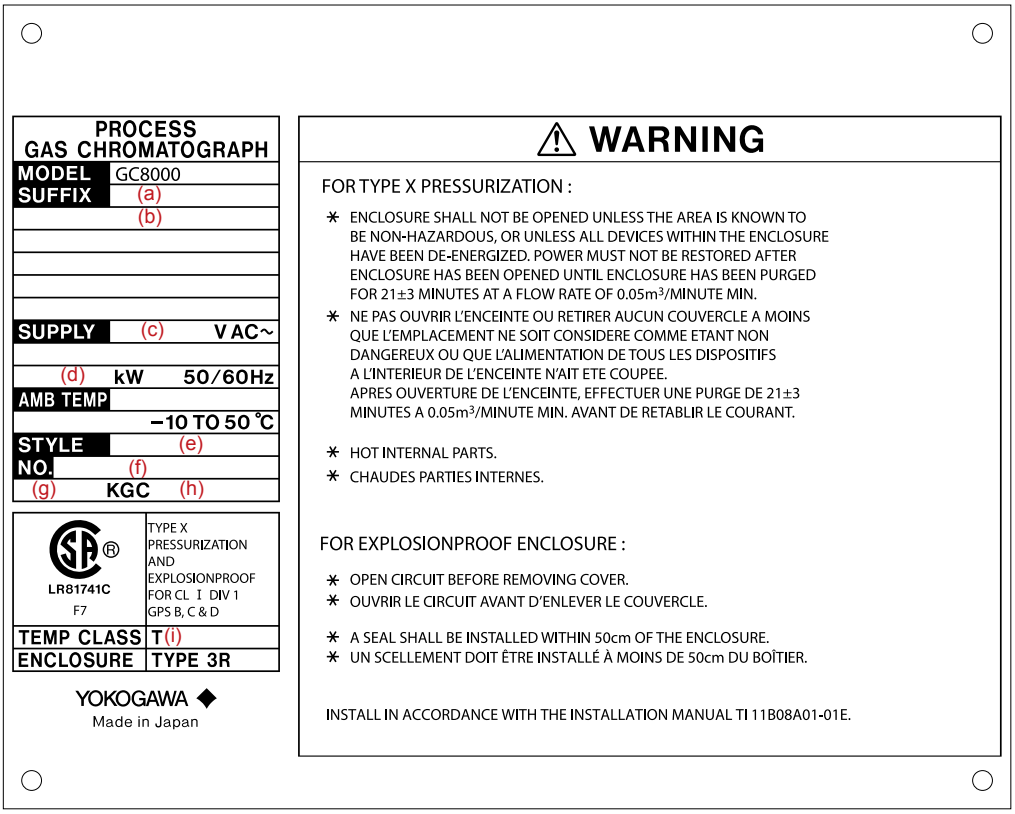
FM-Y


PROCESS
GAS CHROMATOGRAPH
MODEL GC8000
SUFFIX (a)
(b)
SUPPLY (c) V AC~
(d) kW 50/60Hz
AMB TEMP
−10 TO 50 °C
STYLE (e)
NO. (f)
(g) KGC (h)
FM
APPROVED
TYPE X AND
TYPE Y
PRESSURIZATION
FOR CL I DIV 1
GPS B, C&D
TEMP CLASS T (i)
ENCLOSURE NEMA 3R
YOKOGAWA
Made in Japan
⚠ WARNING
* ENCLOSURE SHALL NOT BE OPENED UNLESS THE AREA IS KNOWN TO BE NONHAZARDOUS, OR UNLESS ALL DEVICES WITHIN HAVE BEEN DE-ENERGIZED.
POWER SHALL NOT BE RESTORED AFTER ENCLOSURE HAS BEEN OPENED UNTIL ENCLOSURE HAS BEEN PURGED FOR 21±3 MINUTES AT SPECIFIED PRESSURE INDICATED BY THE PRESSURE GAUGE LABELED "EL.BOX" IN THE PRESSURE AND FLOW CONTROL SECTION.
INSTALL IN ACCORDANCE WITH THE INSTALLATION MANUAL
TI 11B08A01-01E.

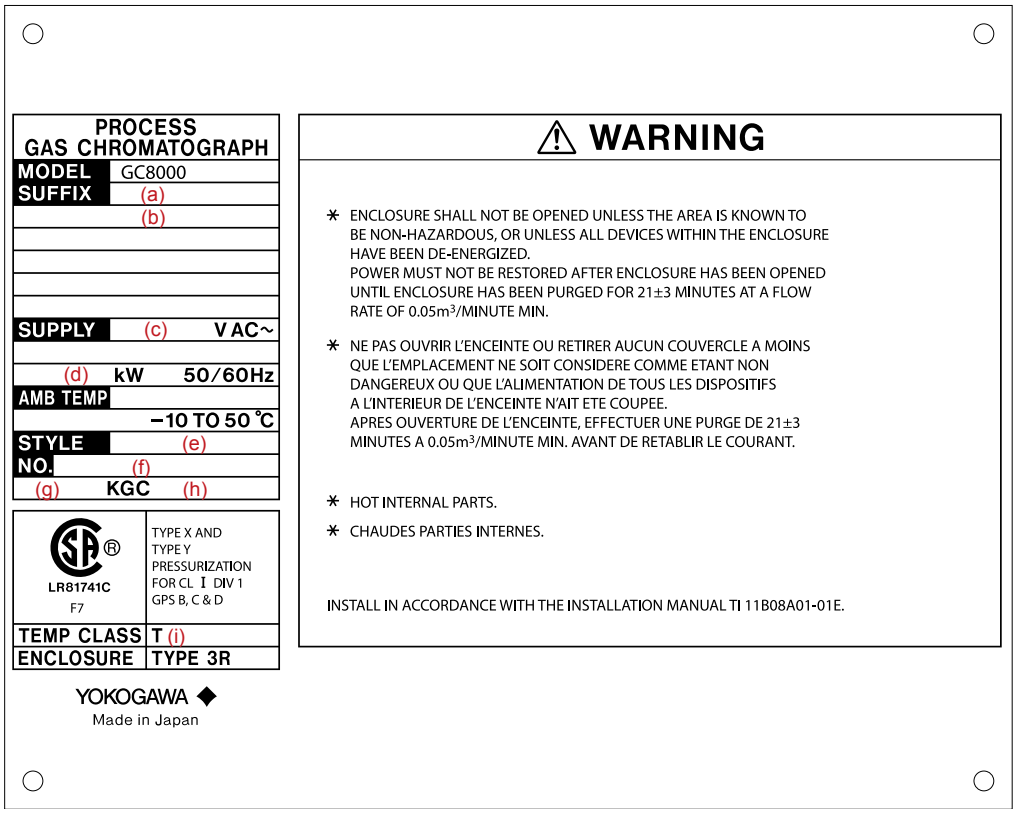
No.	Text	Remarks
(a)	-F, -G	FM-X, FM-Y
(b)	Model and suffix codes	With additional code
(c)	100, 110, 115, 120, 200, 220, 230, 240	Depends on power specifications (-A to -H)
(d)	Maximum rated power	
(e)	Latest style number	
(f)	Instrument number	
(g)	Year of production	In A.D. year
(h)	KGC number	
(i)	(T)1 to (T)4	Depends on temperature class specifications

■ CSA

● CSA-X

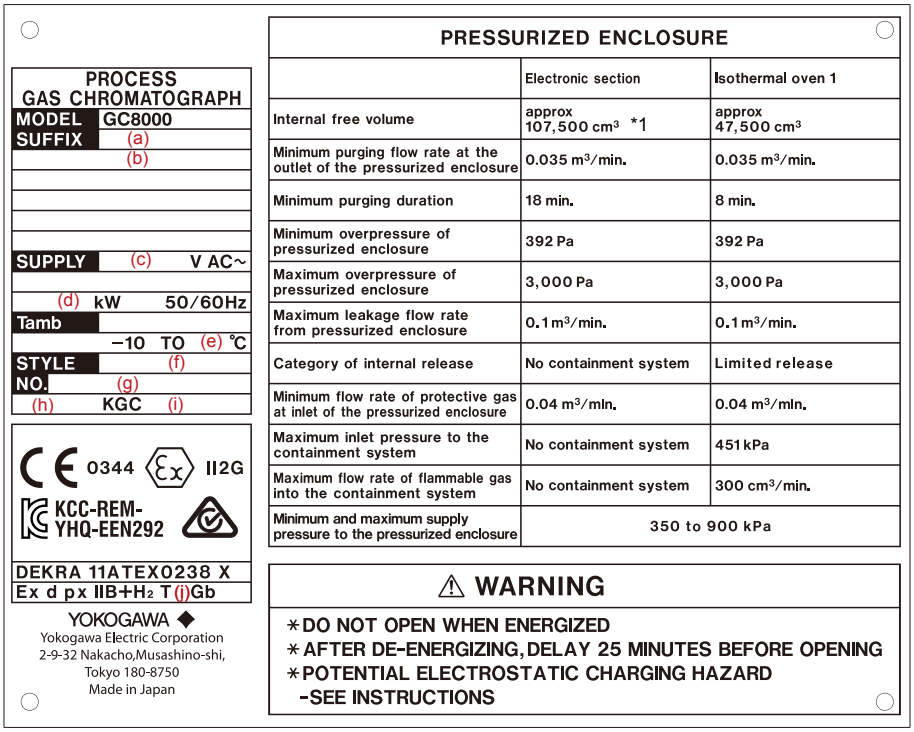

PROCESS
GAS CHROMATOGRAPH
MODEL GC8000
SUFFIX (a)
(b)
SUPPLY (c) V AC~
(d) kW 50/60Hz
AMB TEMP
–10 TO 50 °C
STYLE (e)
NO. (f)
(g) KGC (h)
LR81741C
F7
TYPE X
PRESSURIZATION
AND
EXPLOSIONPROOF
FOR CL I DIV 1
GPS B, C & D
TEMP CLASS T(i)
ENCLOSURE TYPE 3R
YOKOGAWA
Made in Japan
⚠ WARNING
FOR TYPE X PRESSURIZATION :
* ENCLOSURE SHALL NOT BE OPENED UNLESS THE AREA IS KNOWN TO BE NON-HAZARDOUS, OR UNLESS ALL DEVICES WITHIN THE ENCLOSURE HAVE BEEN DE-ENERGIZED. POWER MUST NOT BE RESTORED AFTER ENCLOSURE HAS BEEN OPENED UNTIL ENCLOSURE HAS BEEN PURGED FOR 21±3 MINUTES AT A FLOW RATE OF 0.05m³/MINUTE MIN.
* NE PAS OUVRIR L'ENCEINTE OU RETIRER AUCUN COUVERCLE A MOINS QUE L'EMPLACEMENT NE SOIT CONSIDERE COMME ETANT NON DANGEREUX OU QUE L'ALIMENTATION DE TOUS LES DISPOSITIFS A L'INTERIEUR DE L'ENCEINTE N'AIT ETE COUPEE. APRES OUVERTURE DE L'ENCEINTE, EFFECTUER UNE PURGE DE 21±3 MINUTES A 0.05m³/MINUTE MIN. AVANT DE RETABLIR LE COURANT.
* HOT INTERNAL PARTS.
* CHAUDES PARTIES INTERNES.
FOR EXPLOSIONPROOF ENCLOSURE :
* OPEN CIRCUIT BEFORE REMOVING COVER.
* OUVRIR LE CIRCUIT AVANT D'ENLEVER LE COUVERCLE.
* A SEAL SHALL BE INSTALLED WITHIN 50cm OF THE ENCLOSURE.
* UN SCELLEMENT DOIT ÊTRE INSTALLÉ À MOINS DE 50cm DU BOÎTIER.
INSTALL IN ACCORDANCE WITH THE INSTALLATION MANUAL TI 11B08A01-01E.

CSA-Y


PROCESS
GAS CHROMATOGRAPH
MODEL GC8000
SUFFIX (a)
(b)
SUPPLY (c) V AC~
(d) kW 50/60Hz
AMB TEMP
−10 TO 50 °C
STYLE (e)
NO. (f)
(g) KGC (h)
LR81741C
F7
TYPE X AND
TYPE Y
PRESSURIZATION
FOR CL I DIV 1
GPS B, C & D
TEMP CLASS T (i)
ENCLOSURE TYPE 3R
YOKOGAWA
Made in Japan
WARNING
* ENCLOSURE SHALL NOT BE OPENED UNLESS THE AREA IS KNOWN TO BE NON-HAZARDOUS, OR UNLESS ALL DEVICES WITHIN THE ENCLOSURE HAVE BEEN DE-ENERGIZED.
POWER MUST NOT BE RESTORED AFTER ENCLOSURE HAS BEEN OPENED UNTIL ENCLOSURE HAS BEEN PURGED FOR 21±3 MINUTES AT A FLOW RATE OF 0.05m3/MINUTE MIN.
* NE PAS OUVRIR L'ENCEINTE OU RETIRER AUCUN COUVERCLE A MOINS QUE L'EMPLACEMENT NE SOIT CONSIDERE COMME ETANT NON DANGEREUX OU QUE L'ALIMENTATION DE TOUS LES DISPOSITIFS A L'INTERIEUR DE L'ENCEINTE N'AIT ETE COUPEE.
APRES OUVERTURE DE L'ENCEINTE, EFFECTUER UNE PURGE DE 21±3 MINUTES A 0.05m3/MINUTE MIN. AVANT DE RETABLIR LE COURANT.
* HOT INTERNAL PARTS.
* CHAUDES PARTIES INTERNES.
INSTALL IN ACCORDANCE WITH THE INSTALLATION MANUAL TI 11B08A01-01E.

No.	Text	Remarks
(a)	-C, -D	CSA-X, CSA-Y
(b)	Model and suffix codes	With additional code
(c)	100, 110, 115, 120, 200, 220, 230, 240	Depends on power specifications (-A to -H)
(d)	Maximum rated power	
(e)	Latest style number	
(f)	Instrument number	
(g)	Year of production	In A.D. year
(h)	KGC number	
(i)	(T)1 to (T)4	Depends on temperature class specifications

■ ATEX



In case of Type 1

PRESSURIZED ENCLOSURE		
	Electronic section	Isothermal oven 1
Internal free volume	approx 107,500 cm³ *1	approx 47,500 cm³
Minimum purging flow rate at the outlet of the pressurized enclosure	0.035 m³/min.	0.035 m³/min.
Minimum purging duration	18 min.	8 min.
Minimum overpressure of pressurized enclosure	392 Pa	392 Pa
Maximum overpressure of pressurized enclosure	3,000 Pa	3,000 Pa
Maximum leakage flow rate from pressurized enclosure	0.1 m³/min.	0.1 m³/min.
Category of internal release	No containment system	Limited release
Minimum flow rate of protective gas at inlet of the pressurized enclosure	0.04 m³/min.	0.04 m³/min.
Maximum inlet pressure to the containment system	No containment system	451 kPa
Maximum flow rate of flammable gas into the containment system	No containment system	300 cm³/min.
Minimum and maximum supply pressure to the pressurized enclosure	350 to 900 kPa	

⚠ WARNING

* DO NOT OPEN WHEN ENERGIZED
* AFTER DE-ENERGIZING, DELAY 25 MINUTES BEFORE OPENING
* POTENTIAL ELECTROSTATIC CHARGING HAZARD
  -SEE INSTRUCTIONS

In case of Type 2

PRESSURIZED ENCLOSURE			
	Electronic section	Isothermal oven 1 (large)	Isothermal oven 2 (standard)
Internal free volume	approx 124,000 cm³ *2	approx 47,500 cm³	approx 31,000 cm³
Minimum purging flow rate at the outlet of the pressurized enclosure	0.035 m³/min.	0.035 m³/min.	0.035 m³/min.
Minimum purging duration	18 min.	8 min.	8 min.
Minimum overpressure of pressurized enclosure	392 Pa	392 Pa	392 Pa
Maximum overpressure of pressurized enclosure	3,000 Pa	3,000 Pa	3,000 Pa
Maximum leakage flow rate from pressurized enclosure	0.1 m³/min.	0.1 m³/min.	0.1 m³/min.
Category of internal release	No containment system	Limited release	Limited release
Minimum flow rate of protective gas at inlet of the pressurized enclosure	0.04 m³/min.	0.04 m³/min.	0.04 m³/min.
Maximum inlet pressure to the containment system	No containment system	451 kPa	451 kPa
Maximum flow rate of flammable gas into the containment system	No containment system	300 cm³/min.	300 cm³/min.
Minimum and maximum supply pressure to the pressurized enclosure	350 to 900 kPa		

In case of Type 3

PRESSURIZED ENCLOSURE		
	Electronic section	Isothermal oven 2 × 3 (each of them)
Internal free volume	approx 134,500 cm³ *3	approx 31,000 cm³
Minimum purging flow rate at the outlet of the pressurized enclosure	0.035 m³/min.	0.035 m³/min.
Minimum purging duration	18 min.	8 min.
Minimum overpressure of pressurized enclosure	392 Pa	392 Pa
Maximum overpressure of pressurized enclosure	3,000 Pa	3,000 Pa
Maximum leakage flow rate from pressurized enclosure	0.1 m³/min.	0.1 m³/min.
Category of internal release	No containment system	Limited release
Minimum flow rate of protective gas at inlet of the pressurized enclosure	0.04 m³/min.	0.04 m³/min.
Maximum inlet pressure to the containment system	No containment system	451 kPa
Maximum flow rate of flammable gas into the containment system	No containment system	300 cm³/min.
Minimum and maximum supply pressure to the pressurized enclosure	350 to 900 kPa	

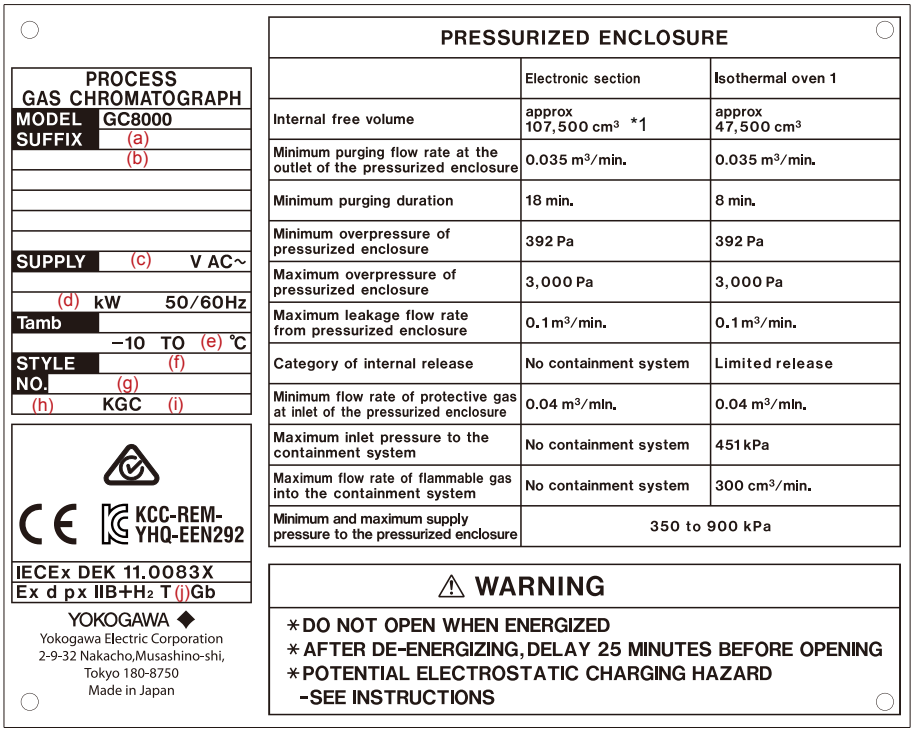
*1: Approx. 110,000 cm³ with EPC
*2: Approx. 129,000 cm³ with EPC
*3: Approx. 142,000 cm³ with EPC
*4: Approx. 120,500 cm³ with EPC

In case of Type 4

PRESSURIZED ENCLOSURE			
	Electronic section	Isothermal oven 2	Programmed temperature oven
Internal free volume	approx 118,000 cm³ *4	approx 31,000 cm³	approx 11,000 cm³
Minimum purging flow rate at the outlet of the pressurized enclosure	0.035 m³/min.	0.035 m³/min.	0.035 m³/min.
Minimum purging duration	18 min.	8 min.	8 min.
Minimum overpressure of pressurized enclosure	392 Pa	392 Pa	392 Pa
Maximum overpressure of pressurized enclosure	3,000 Pa	3,000 Pa	2,000 Pa
Maximum leakage flow rate from pressurized enclosure	0.1 m³/min.	0.1 m³/min.	0.1 m³/min.
Category of internal release	No containment system	Limited release	Limited release
Minimum flow rate of protective gas at inlet of the pressurized enclosure	0.04 m³/min.	0.04 m³/min.	0.04 m³/min.
Maximum inlet pressure to the containment system	No containment system	451 kPa	451 kPa
Maximum flow rate of flammable gas into the containment system	No containment system	300 cm³/min.	300 cm³/min.
Minimum and maximum supply pressure to the pressurized enclosure	350 to 900 kPa		

No.	Text	Remarks
(a)	-A	ATEX
(b)	Model and suffix codes	With additional code
(c)	100, 110, 115, 120, 200, 220, 230, 240	Depends on power specifications (-A to -H)
(d)	Maximum rated power	
(e)	40, 45, 50	T1, T2: 40 °C, T3: 45 °C, T4: 50 °C
(f)	Latest style number	
(g)	Instrument number	
(h)	Year of production	In A.D. year
(i)	KGC number	
(j)	(T)1 to (T)4	Depends on temperature class specifications

IECEx



In case of Type 1

PRESSURIZED ENCLOSURE		
	Electronic section	Isothermal oven 1
Internal free volume	approx 107,500 cm³ *1	approx 47,500 cm³
Minimum purging flow rate at the outlet of the pressurized enclosure	0.035 m³/min.	0.035 m³/min.
Minimum purging duration	18 min.	8 min.
Minimum overpressure of pressurized enclosure	392 Pa	392 Pa
Maximum overpressure of pressurized enclosure	3,000 Pa	3,000 Pa
Maximum leakage flow rate from pressurized enclosure	0.1 m³/min.	0.1 m³/min.
Category of internal release	No containment system	Limited release
Minimum flow rate of protective gas at inlet of the pressurized enclosure	0.04 m³/min.	0.04 m³/min.
Maximum inlet pressure to the containment system	No containment system	451 kPa
Maximum flow rate of flammable gas into the containment system	No containment system	300 cm³/min.
Minimum and maximum supply pressure to the pressurized enclosure	350 to 900 kPa	

⚠ WARNING

* DO NOT OPEN WHEN ENERGIZED
* AFTER DE-ENERGIZING, DELAY 25 MINUTES BEFORE OPENING
* POTENTIAL ELECTROSTATIC CHARGING HAZARD
  -SEE INSTRUCTIONS

In case of Type 2

PRESSURIZED ENCLOSURE			
	Electronic section	Isothermal oven 1 (large)	Isothermal oven 2 (standard)
Internal free volume	approx 124,000 cm³ *2	approx 47,500 cm³	approx 31,000 cm³
Minimum purging flow rate at the outlet of the pressurized enclosure	0.035 m³/min.	0.035 m³/min.	0.035 m³/min.
Minimum purging duration	18 min.	8 min.	8 min.
Minimum overpressure of pressurized enclosure	392 Pa	392 Pa	392 Pa
Maximum overpressure of pressurized enclosure	3,000 Pa	3,000 Pa	3,000 Pa
Maximum leakage flow rate from pressurized enclosure	0.1 m³/min.	0.1 m³/min.	0.1 m³/min.
Category of internal release	No containment system	Limited release	Limited release
Minimum flow rate of protective gas at inlet of the pressurized enclosure	0.04 m³/min.	0.04 m³/min.	0.04 m³/min.
Maximum inlet pressure to the containment system	No containment system	451 kPa	451 kPa
Maximum flow rate of flammable gas into the containment system	No containment system	300 cm³/min.	300 cm³/min.
Minimum and maximum supply pressure to the pressurized enclosure	350 to 900 kPa		

In case of Type 3

PRESSURIZED ENCLOSURE		
	Electronic section	Isothermal oven 2 × 3 (each of them)
Internal free volume	approx 134,500 cm³ *3	approx 31,000 cm³
Minimum purging flow rate at the outlet of the pressurized enclosure	0.035 m³/min.	0.035 m³/min.
Minimum purging duration	18 min.	8 min.
Minimum overpressure of pressurized enclosure	392 Pa	392 Pa
Maximum overpressure of pressurized enclosure	3,000 Pa	3,000 Pa
Maximum leakage flow rate from pressurized enclosure	0.1 m³/min.	0.1 m³/min.
Category of internal release	No containment system	Limited release
Minimum flow rate of protective gas at inlet of the pressurized enclosure	0.04 m³/min.	0.04 m³/min.
Maximum inlet pressure to the containment system	No containment system	451 kPa
Maximum flow rate of flammable gas into the containment system	No containment system	300 cm³/min.
Minimum and maximum supply pressure to the pressurized enclosure	350 to 900 kPa	

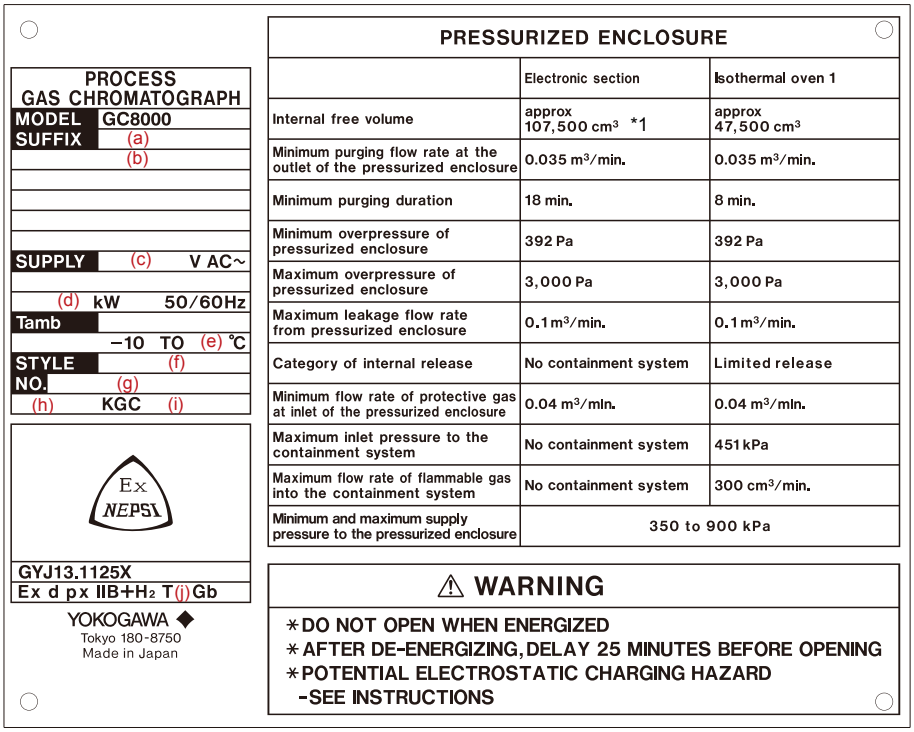
*1: Approx. 110,000 cm³ with EPC
*2: Approx. 129,000 cm³ with EPC
*3: Approx. 142,000 cm³ with EPC
*4: Approx. 120,500 cm³ with EPC

In case of Type 4

PRESSURIZED ENCLOSURE			
	Electronic section	Isothermal oven 2	Programmed temperature oven
Internal free volume	approx 118,000 cm³ *4	approx 31,000 cm³	approx 11,000 cm³
Minimum purging flow rate at the outlet of the pressurized enclosure	0.035 m³/min.	0.035 m³/min.	0.035 m³/min.
Minimum purging duration	18 min.	8 min.	8 min.
Minimum overpressure of pressurized enclosure	392 Pa	392 Pa	392 Pa
Maximum overpressure of pressurized enclosure	3,000 Pa	3,000 Pa	2,000Pa
Maximum leakage flow rate from pressurized enclosure	0.1 m³/min.	0.1 m³/min.	0.1 m³/min.
Category of internal release	No containment system	Limited release	Limited release
Minimum flow rate of protective gas at inlet of the pressurized enclosure	0.04 m³/min.	0.04 m³/min.	0.04 m³/min.
Maximum inlet pressure to the containment system	No containment system	451 kPa	451 kPa
Maximum flow rate of flammable gas into the containment system	No containment system	300 cm³/min.	300 cm³/min.
Minimum and maximum supply pressure to the pressurized enclosure	350 to 900 kPa		

No.	Text	Remarks
(a)	-E	IECEx
(b)	Model and suffix codes	With additional code
(c)	100, 110, 115, 120, 200, 220, 230, 240	Depends on power specifications (-A to -H)
(d)	Maximum rated power	
(e)	40, 45, 50	T1, T2: 40 °C, T3: 45 °C, T4: 50 °C
(f)	Latest style number	
(g)	Instrument number	
(h)	Year of production	In A.D. year
(i)	KGC number	
(j)	(T)1 to (T)4	Depends on temperature class specifications

NEPSI



PROCESS GAS CHROMATOGRAPH	
MODEL	GC8000
SUFFIX	(a)
	(b)
SUPPLY	(c) V AC~
	(d) kW 50/60Hz
Tamb	−10 TO (e) ℃
STYLE	(f)
NO.	(g)
(h)	KGC (i)

Ex NEPSI

GYJ13.1125X

Ex d px IIB+H_2 T(j) Gb

YOKOGAWA ◆
Tokyo 180-8750
Made in Japan

PRESSURIZED ENCLOSURE

In case of Type 1

	Electronic section	Isothermal oven 1
Internal free volume	approx 107,500 cm^3 *1	approx 47,500 cm^3
Minimum purging flow rate at the outlet of the pressurized enclosure	0.035 m^3/min.	0.035 m^3/min.
Minimum purging duration	18 min.	8 min.
Minimum overpressure of pressurized enclosure	392 Pa	392 Pa
Maximum overpressure of pressurized enclosure	3,000 Pa	3,000 Pa
Maximum leakage flow rate from pressurized enclosure	0.1 m^3/min.	0.1 m^3/min.
Category of internal release	No containment system	Limited release
Minimum flow rate of protective gas at inlet of the pressurized enclosure	0.04 m^3/min.	0.04 m^3/min.
Maximum inlet pressure to the containment system	No containment system	451 kPa
Maximum flow rate of flammable gas into the containment system	No containment system	300 cm^3/min.
Minimum and maximum supply pressure to the pressurized enclosure	350 to 900 kPa	

⚠ WARNING

* DO NOT OPEN WHEN ENERGIZED
* AFTER DE-ENERGIZING, DELAY 25 MINUTES BEFORE OPENING
* POTENTIAL ELECTROSTATIC CHARGING HAZARD
  -SEE INSTRUCTIONS

In case of Type 2

PRESSURIZED ENCLOSURE

	Electronic section	Isothermal oven 1 (large)	Isothermal oven 2 (standard)
Internal free volume	approx 124,000 cm^3 *2	approx 47,500 cm^3	approx 31,000 cm^3
Minimum purging flow rate at the outlet of the pressurized enclosure	0.035 m^3/min.	0.035 m^3/min.	0.035 m^3/min.
Minimum purging duration	18 min.	8 min.	8 min.
Minimum overpressure of pressurized enclosure	392 Pa	392 Pa	392 Pa
Maximum overpressure of pressurized enclosure	3,000 Pa	3,000 Pa	3,000 Pa
Maximum leakage flow rate from pressurized enclosure	0.1 m^3/min.	0.1 m^3/min.	0.1 m^3/min.
Category of internal release	No containment system	Limited release	Limited release
Minimum flow rate of protective gas at inlet of the pressurized enclosure	0.04 m^3/min.	0.04 m^3/min.	0.04 m^3/min.
Maximum inlet pressure to the containment system	No containment system	451 kPa	451 kPa
Maximum flow rate of flammable gas into the containment system	No containment system	300 cm^3/min.	300 cm^3/min.
Minimum and maximum supply pressure to the pressurized enclosure	350 to 900 kPa		

In case of Type 3

PRESSURIZED ENCLOSURE

	Electronic section	Isothermal oven 2 × 3 (each of them)
Internal free volume	approx 134,500 cm^3 *3	approx 31,000 cm^3
Minimum purging flow rate at the outlet of the pressurized enclosure	0.035 m^3/min.	0.035 m^3/min.
Minimum purging duration	18 min.	8 min.
Minimum overpressure of pressurized enclosure	392 Pa	392 Pa
Maximum overpressure of pressurized enclosure	3,000 Pa	3,000 Pa
Maximum leakage flow rate from pressurized enclosure	0.1 m^3/min.	0.1 m^3/min.
Category of internal release	No containment system	Limited release
Minimum flow rate of protective gas at inlet of the pressurized enclosure	0.04 m^3/min.	0.04 m^3/min.
Maximum inlet pressure to the containment system	No containment system	451 kPa
Maximum flow rate of flammable gas into the containment system	No containment system	300 cm^3/min.
Minimum and maximum supply pressure to the pressurized enclosure	350 to 900 kPa	

*1: Approx. 110,000 cm^3 with EPC
*2: Approx. 129,000 cm^3 with EPC
*3: Approx. 142,000 cm^3 with EPC
*4: Approx. 120,500 cm^3 with EPC

In case of Type 4

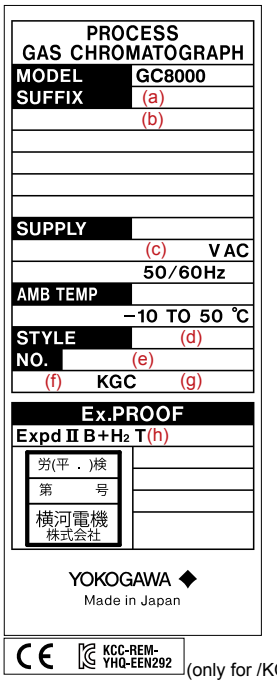
PRESSURIZED ENCLOSURE

	Electronic section	Isothermal oven 2	Programmed temperature oven
Internal free volume	approx 118,000 cm^3 *4	approx 31,000 cm^3	approx 11,000 cm^3
Minimum purging flow rate at the outlet of the pressurized enclosure	0.035 m^3/min.	0.035 m^3/min.	0.035 m^3/min.
Minimum purging duration	18 min.	8 min.	8 min.
Minimum overpressure of pressurized enclosure	392 Pa	392 Pa	392 Pa
Maximum overpressure of pressurized enclosure	3,000 Pa	3,000 Pa	2,000 Pa
Maximum leakage flow rate from pressurized enclosure	0.1 m^3/min.	0.1 m^3/min.	0.1 m^3/min.
Category of internal release	No containment system	Limited release	Limited release
Minimum flow rate of protective gas at inlet of the pressurized enclosure	0.04 m^3/min.	0.04 m^3/min.	0.04 m^3/min.
Maximum inlet pressure to the containment system	No containment system	451 kPa	451 kPa
Maximum flow rate of flammable gas into the containment system	No containment system	300 cm^3/min.	300 cm^3/min.
Minimum and maximum supply pressure to the pressurized enclosure	350 to 900 kPa		

No.	Text	Remarks
(a)	-P	NEPSI
(b)	Model and suffix codes	With additional code
(c)	100, 110, 115, 120, 200, 220, 230, 240	Depends on power specifications (-A to -H)
(d)	Maximum rated power	
(e)	40, 45, 50	T1, T2: 40 °C, T3: 45 °C, T4: 50 °C
(f)	Latest style number	
(g)	Instrument number	
(h)	Year of production	In A.D. year
(i)	KGC number	
(j)	(T)1 to (T)4	Depends on temperature class specifications

TIIS

In case of Type 1



PRESSURIZED ENCLOSURE 内圧防爆に関する事項		
	ELECTRIC PART 電気回路部	ISOTHERMAL OVEN (L) 恒温槽（大）
INTERNAL FREE VOLUME 容器の内容積	APPROX 約107,500cm³ *1	APPROX 約47,500cm³
ENCLOSURE OVERPRESSURE 給気口の所要圧力	490Pa	490Pa
AIR SUPPLY REQUIRED 給気口の所要風量	50l/min	50l/min
MAXIMUM ENCLOSURE OVERPRESSURE 保護ガスの最高圧力	980Pa	980Pa

⚠ WARNING

Wait 25 minutes or more after power disconnection, before opening the door and the cover of electronic section with administrator's permission.

⚠ 警告

電気回路部のドアおよびカバーを開ける際は、
管理者の許可のもとで電源遮断後、25分以上経過してから行って下さい。

CE KCC-REM-YHQ-EEN292 (only for /KC)

In case of Type 2

PRESSURIZED ENCLOSURE 内圧防爆に関する事項			
	ELECTRIC PART 電気回路部	ISOTHERMAL OVEN(L) 恒温槽（大）	ISOTHERMAL OVEN 恒温槽
INTERNAL FREE VOLUME 容器の内容積	APPROX 約124,000cm³ *2	APPROX 約47,500cm³	APPROX 約31,000cm³
ENCLOSURE OVERPRESSURE 給気口の所要圧力	490Pa	490Pa	490Pa
AIR SUPPLY REQUIRED 給気口の所要風量	50l/min	50l/min	50l/min
MAXIMUM ENCLOSURE OVERPRESSURE 保護ガスの最高圧力	980Pa	980Pa	980Pa

In case of Type 3

PRESSURIZED ENCLOSURE 内圧防爆に関する事項		
	ELECTRIC PART 電気回路部	ISOTHERMAL OVEN × 3 (EACH OF THEM) 恒温槽×3台（1台あたり）
INTERNAL FREE VOLUME 容器の内容積	APPROX 約134,500cm³ *3	APPROX 約31,000cm³
ENCLOSURE OVERPRESSURE 給気口の所要圧力	490Pa	490Pa
AIR SUPPLY REQUIRED 給気口の所要風量	50l/min	50l/min
MAXIMUM ENCLOSURE OVERPRESSURE 保護ガスの最高圧力	980Pa	980Pa

In case of Type 4

PRESSURIZED ENCLOSURE 内圧防爆に関する事項			
	ELECTRIC PART 電気回路部	ISOTHERMAL OVEN 恒温槽	PROGRAMMED TEMPERATURE OVEN 昇温槽
INTERNAL FREE VOLUME 容器の内容積	APPROX 約118,000cm³ *4	APPROX 約31,000cm³	APPROX 約11,000cm³
ENCLOSURE OVERPRESSURE 給気口の所要圧力	490Pa	490Pa	490Pa
AIR SUPPLY REQUIRED 給気口の所要風量	50l/min	50l/min	50l/min
MAXIMUM ENCLOSURE OVERPRESSURE 保護ガスの最高圧力	980Pa	980Pa	980Pa

*1: Approx. 110,000 cm^3 with EPC
*2: Approx. 129,000 cm^3 with EPC
*3: Approx. 142,000 cm^3 with EPC
*4: Approx. 120,500 cm^3 with EPC

No.	Text	Remarks
(a)	-T	TIIS
(b)	Model and suffix codes	With additional code
(c)	100 ±10%, 110 ±10%, 115 ±10%, 120 ±10%, 200 ±10%, 220 ±10%, 230 ±10%, 240 ±10%	Depends on power specifications (-A to -H)
(d)	Latest style number	
(e)	Instrument number	
(f)	Year of production	In A.D. year
(g)	KGC number	
(h)	(T)1 to (T)4	Depends on temperature class specifications

2. Installation, Piping, and Wiring

If the process gas chromatograph is installed in a hazardous area, do the wiring according to the applicable explosionproof requirements.

2.1 Installation

Refer to “1.1 Wiring and Piping Diagram.”

2.1.1 Installing the Analyzer

Two types of analyzer are available: self-standing and wall-mounted. Install the chromatograph according to the procedure for each type.

(1) Installation site

The following conditions must be met:

(a) Satisfying specified environmental conditions (atmospheric gases) even if it is a hazardous area.

(b) No vibration

(c) Not subject to rainfall or direct sunlight

(d) No corrosive gas and little dust

(e) Environmental temperature: –10 to 50°C, humidity: 95% RH or less

(f) Altitude of installation site: Max. 2000 m above sea level

(g) Installation category based on IEC 61010: II (See NOTE)

(h) Pollution degree based on IEC 61010: 2 (See NOTE)

NOTE:

- The “Installation category” indicates the regulation for withstanding impulse voltage. It is also called the “Overvoltage category”. “II” applies to electrical equipment.
- “Pollution degree” describes the degree to which a solid, liquid or gas which degrades dielectric strength is adhering. “2” applies to a normal indoor atmosphere.

(2) Analyzer house

If the analyzer is installed outdoors, it should be constructed so as to protect it from rain and direct sunlight and to facilitate inspection and maintenance.

Figure 2.1 shows an example of an analyzer house.

The house should be designed to provide space for standard gas cylinders because the effects of the ambient temperature on standard gas can be better controlled indoors than outdoors.

It is also desirable for maintenance that the house accommodates an external sampling system if any, except when leakage of toxic or flammable standard gas is to be avoided indoors.

The floor area shown in Figure 2.1 is the minimum requirement for the house. Allow as much area as possible for the house taking into consideration the types of items to be accommodated and the space required for maintenance.

For the maintenance space, refer to “1.2 External Dimensions.”

Provide ventilation openings in the upper portion (near the ceiling) and lower portion (near the floor) of a side wall of the house.

Also provide a window and electric lights.

Carrier gas cylinders, should be protected from exposure to direct sunlight and rainfall by placing them under the eaves of the house.

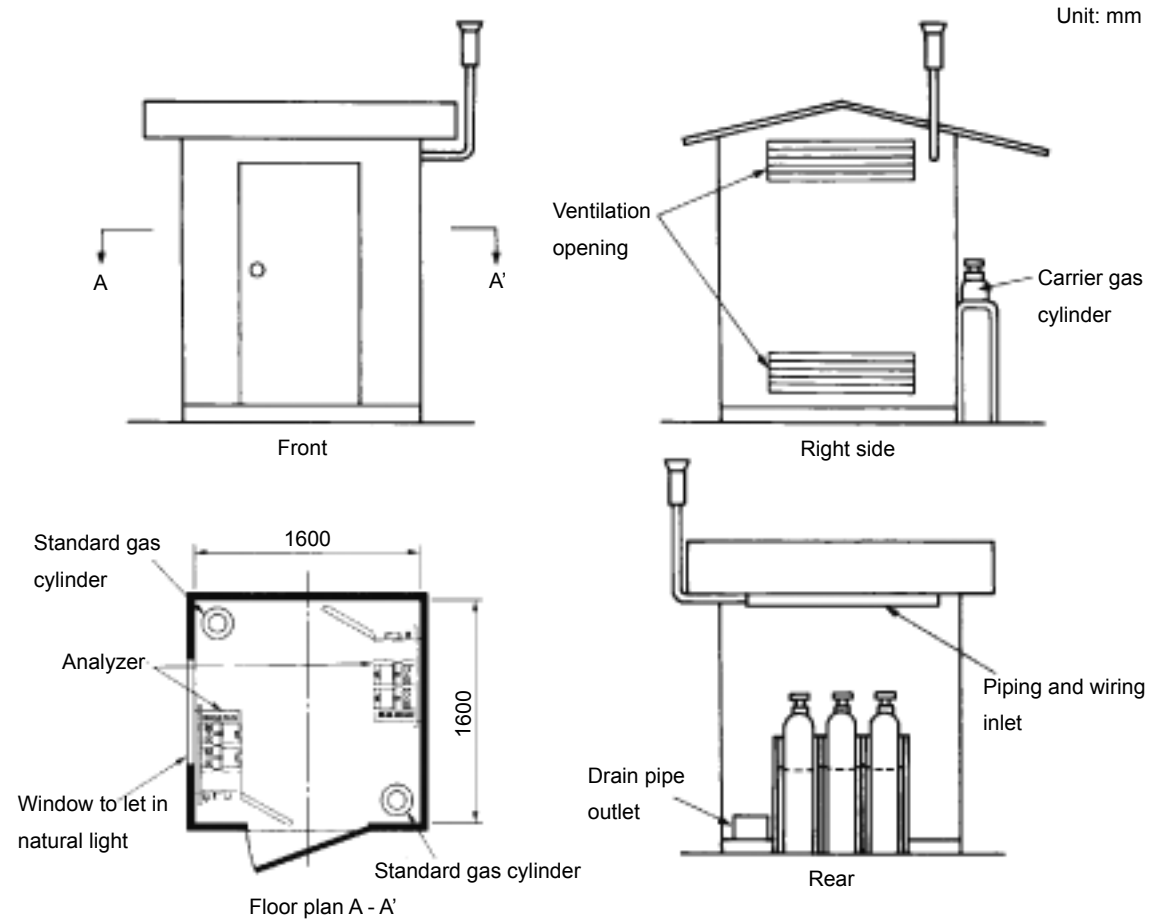


Figure 2.1 Example of analyzer house

(3) Unpacking

WARNING

- The GC8000 weighs about 100 to 220 kg. Unpack it near the installation site. Use a transportation machine to move it. Handle it carefully to prevent it from falling.
- For lifting and carrying equipment, use two brackets at which GC8000 is fixed to the crate (made of wood etc.). Use wall-mounting brackets or their equivalent (unpainted brackets are attached to self-standing type for transportation).
- Up to two protection system may be included, each of which weighs approximately 7 kg, are installed on top of the GC8000. Therefore, the center of gravity is higher than the center of the analyzer body.

(4) Checking equipment

Check that the equipment has not been damaged during transportation. Contact Yokogawa if any damage is found. Keep the packing such as crates.

Model and Suffix Codes

Check that the model and suffix codes on the data plate on the left side of the GC8000 match those on the order sheet. Refer to “1.6 Data Plate.”

Accessories

Check the accessories listed in Table 2.1 and Table 2.2.

Table 2.1 Accessory kit

			Accessory kit part number (K9800**)																		Remark
			EA	EB	EC	ED	HE	HF	HG	HH	EG	EH	EJ	EK	EE	EF	HA	HB	HC	HD	
			TIIS								FM-X, CSA-X		FM-Y, CSA-X		ATEX, IECEx, NEPSI						
Type 1			○		○		○		○		○		○		○		○		○		
Type 2 (200V)			○		○		○		○		○		○		○		○		○		
Type 2 (100 V)				○		○		○		○		○		○		○		○		○	
Type 3				○		○		○		○		○		○		○		○		○	
Type 4				○		○		○		○		○		○		○		○		○	
			P	P	Q	Q	P	P	Q	Q					R	R	Q	Q	P	P	G, Q: 3/4NPT, P: G3/4, R: M25x1.5
Option ciode /KC							○	○	○	○											
No.	**Item**	**Parts No.**	**Quantity**																		**Remark**
1	Cable packing adapter	B1010EN	2	3	2	3	2	3	2	3											
2	Packing	—	2	3	2	3	2	3	2	3											For B1010EN
3	Manual	K9800FG	1	1	1	1	1	1	1	1											For B1010EN
4	Packing	—	6	6	6	6	6	6	6	6											For B1009EN
5	Manual	K9800GE	1	1	1	1	1	1	1	1											For B1009EN
6	Connector	K9402PU			8	9			8	9											3/4NPT
7	Connector	K9800FX															2	3			3/4NPT
		K9407PU																	2	3	G3/4
8	O-ring	Y9118XA															2	3	2	3	
9	Sealing fitting	L9811GQ	1	1	1	1	1	1	1	1											For sealing fitting
10	Nipple	K9194ZU	1	1	1	1	1	1	1	1											
11	Nut	K9194ZU	2	2	2	2	2	2	2	2											
12	Manual	K9800GF	1	1	1	1	1	1	1	1											
13	Hex wrench	L9827AT	2	2	2	2	2	2	2	2											
		L9827AC	2	2	2	2	2	2	2	2	2	2			2	2	2	2	2	2	
		L9827AS	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	
14	Fuse	A1423EF	2	2	2	2	2	2	2	2	2	2			2	2	2	2	2	2	
		A1463EF	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	
15	Fuse	A1598EF	2	4	2	4	2	4	2	4	2	4	2	4	2	4	2	4	2	4	UP300
16	Label	K9191NK	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	For pressure gauge
17	Ferrite core	A1179MN					1	2	1	2					1	2	1	2	1	2	
18	Key	B1018HL	4 or 6	6 or 8	4 or 6	6 or 8	4 or 6	6 or 8	4 or 6	6 or 8	4 or 6	6 or 8	4 or 6	6 or 8	4 or 6	6 or 8	4 or 6	6 or 8	4 or 6	6 or 8	

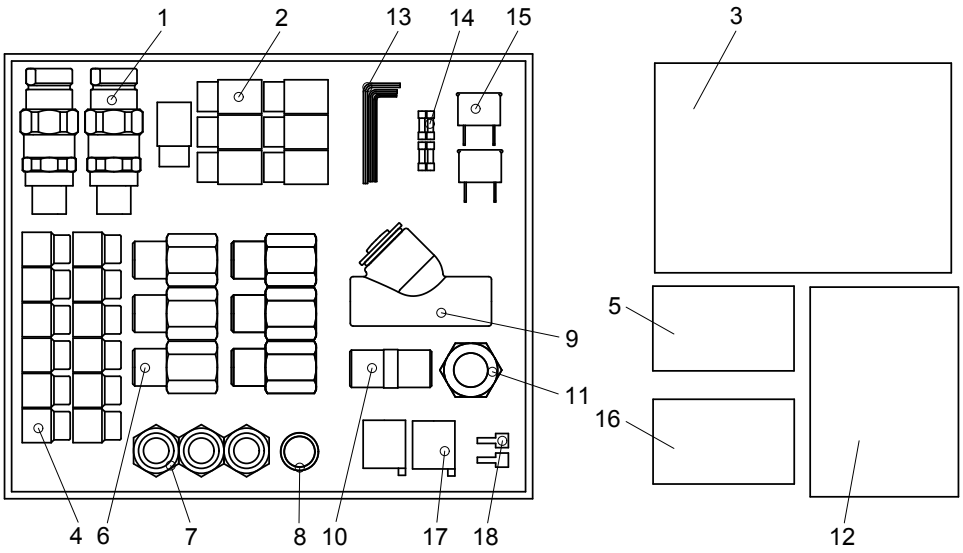


Figure 2.2 Accessory kit

Note:

Table 2.2

Item	Parts number	Quantity	Remark
Coil over wrench for LSV	L9827EA	1	
Seal kit for LSV	K9402VG	number of LSV	Rulon
Seal kit for LSV	K9402VH	number of LSV	Teflon
Ferrule	J9218VU	1 set	For capillary column
Ferrule	J9218VT	1 set	For megabore column
Cutter	J9218VV	1	For megabore or capillary column
User's manual (CD)	—	1	IM 11B08A01-51E
Operation data	—	1	

(5) Installation

Use anchor bolts to secure the self-standing type analyzer on the floor.

Use nuts and bolts to secure the wall-mounted type analyzer on the wall. The wall construction has to be designed for four times the weight of the analyzer.

For the hole for installation, refer to "1.2 External Dimensions."

2.1.2 Installing Auxiliary Hardware

(1) Cylinders

The following conditions must be met:

(a) Located near the analyzer or the external sampling system.

(b) Not subject to rainfall or direct sunlight

(c) Ambient temperature: 0 to 40°C

(d) The place should be well-ventilated so that leaking gases, if any, do not accumulate.

Comply with regulations for high-pressure gases.

(2) Other items

(a) Dehumidifier

Provide a dehumidifier between the carrier gas cylinders and the analyzer (as near the analyzer as possible).

(b) Sample-gas pressure regulator

Provide sample-gas pressure regulators between the sampling point and the analyzer or the external sampling system (as near the sampling point as possible).

(c) Vent stack, Drain tank

Without Vent Stack

Provide a header with a diameter of about 5 cm near the analyzer to connect the venting lines. Extend the vent stack outside the house using a pipe with 1.5 cm diameter. Make provisions to prevent rain from getting in the top end of the vent stack. (See Figure 2.4.)

With Vent Stack

Connect the top end of the vent stack to the section for exhaust. Extend the vent stack outside the house using a pipe with 1.5 cm diameter. Make provisions to prevent rain from getting in the top end of the vent stack.

When using a TCD detector, plug the lower end of the vent stack. When using a FID or FPD detector, provide a drain tank with a diameter of about 5 cm near the analyzer to the venting lines.

For the details, see Figure 2.5.

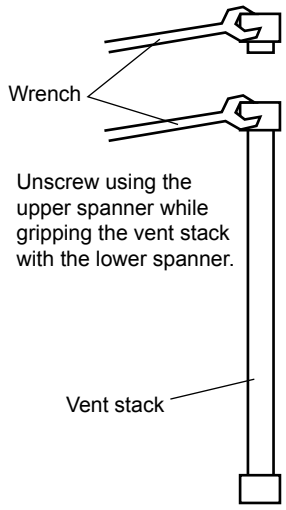


Figure 2.3 Unscrewing the vent stack

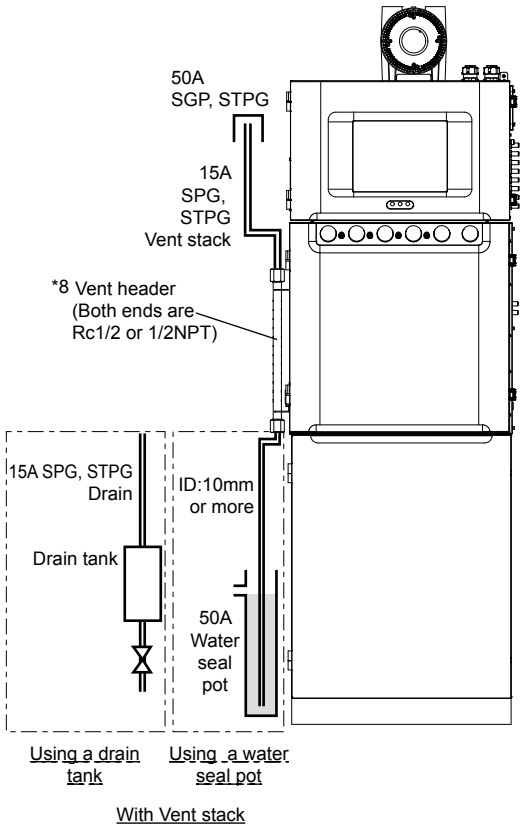
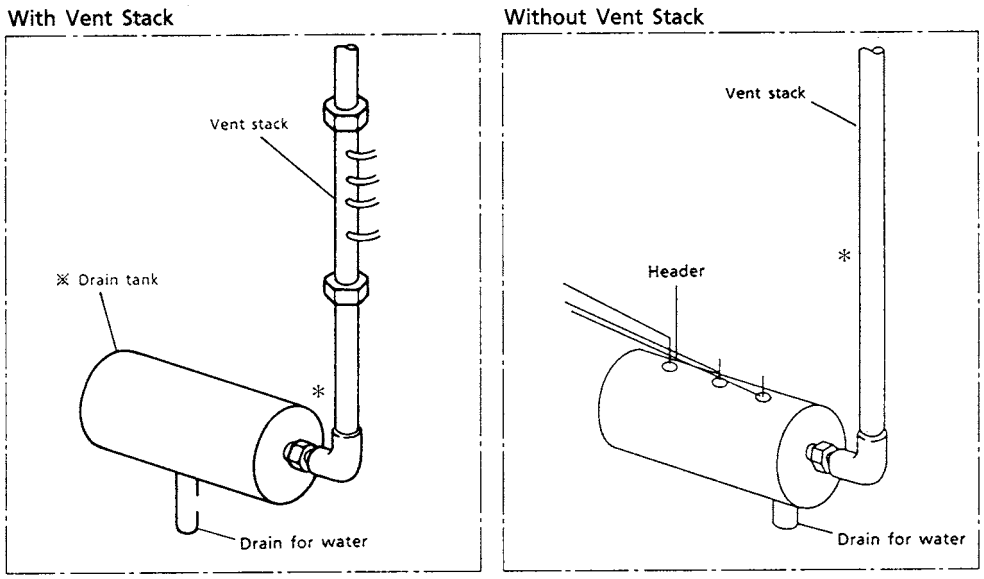


Figure 2.4 Example of vent stack installation



Note 1: The drain tank is used only for FID/FPD.
Note 2: For FID/FPD, incline the piping so that drain water will not accumulate in it.

Figure 2.5 Example of vent stack construction

2.2 Piping

IMPORTANT

- Do not remove the blind plugs at the analyzer piping connections until starting piping work to prevent deterioration of the columns. On the condition that carrier gas does not be supplied after the blind plugs taken out or during out of operation, the column has the risk of deterioration. In these condition, fix the the blind plugs at each vent with carrier gas enclosed.
- Use an anti-corrosion material for the pipes and pipe fittings.
- Never use pipes with too large a diameter for the sample inlet piping, for reducing dead time. However, use a little larger pipe for the exhaust line so as not to apply back pressure to the venting lines.
- Use pipes and pipe fittings free from interior contamination such as grease, oil or other substances. The contamination damage the analyzer. Before connecting the pipes, completely air-purge their interiors.
- Carefully connect the pipes so that there is no leakage from the pipe connections such as the joints.
- Use filters or other appropriate pipe fittings to prevent dust, moisture, or other foreign matter from getting into the analyzer.

2.2.1 Types of Piping and Installation

The types of piping are shown below.

Note that the types of piping and quantities of individual pipes required vary with the specifications such as the analyzer type and detector type (TCD, FID, or FPD).

See the flow sheets in the “Operation Data” for implementing piping.

Control unit

(A) Air output for stream valve 1 to 8 (AIR OUT 1 to AIR OUT 8)

Isothermal oven, large isothermal oven, programmed temperature oven

(B) Protective gas (instrumental air) inlet (PURGE AIR)

(C) Inlet/outlet of sample gas (SAMPLE 1 IN, SAMPLE 2 IN, SAMPLE 1 OUT, SAMPLE 2 OUT)

(D) Carrier gas (CARRIER 1, CARRIER 2)

(E) Hydrogen gas for combustion (H2)

(F) Make-up gas (MAKE UP)

(G) Air for combustion (BURNER AIR)

(H) Air output (ATM 1, ATM 2)

(J) FID vent (FID 1, FID 2)

(K) FPD vent (FPD 1)

(L) TCD vent (TCD1, REF.1, TCD2, REF.2)

(M) Vent (VENT 1 to VENT 10)

Analyzer base sampling system (GCSMP)

(1) Sample inlet (STREAM #1 to STREAM #12)

(2) Standard-gas inlet (STANDARD #1 to STANDARD #3)

(3) Sample bypass vent (STREAM #1 B/P VENT to STREAM #12 B/P VENT)

(4) Sample vent (SAMPLE VENT 1 to SAMPLE VENT 3)
(5) Condensate drain (CONDENSATE OUT)
(6) Steam (STEAM IN)
(7) Steam drain (STEAM OUT)

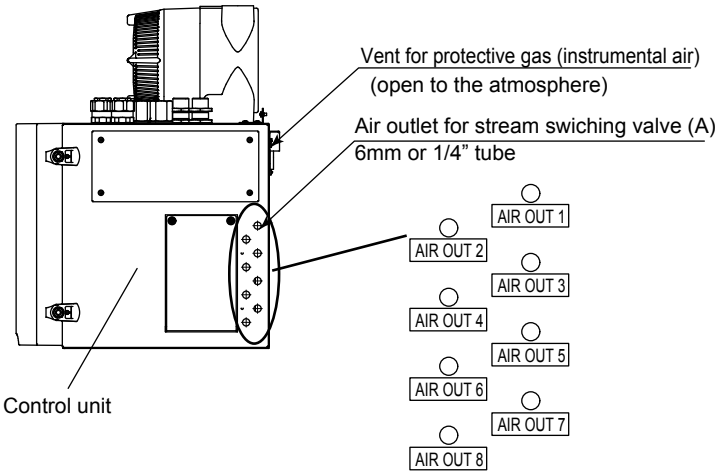


Figure 2.6 Right side of control unit

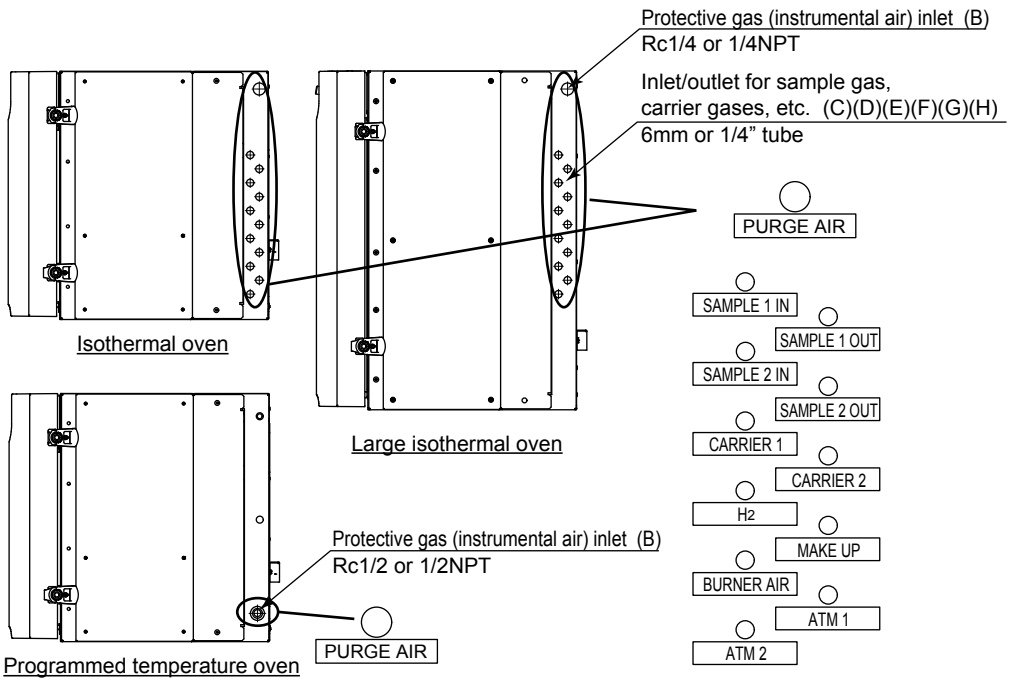


Figure 2.7 Left side of isothermal oven, large isothermal oven, and programmed temperature oven

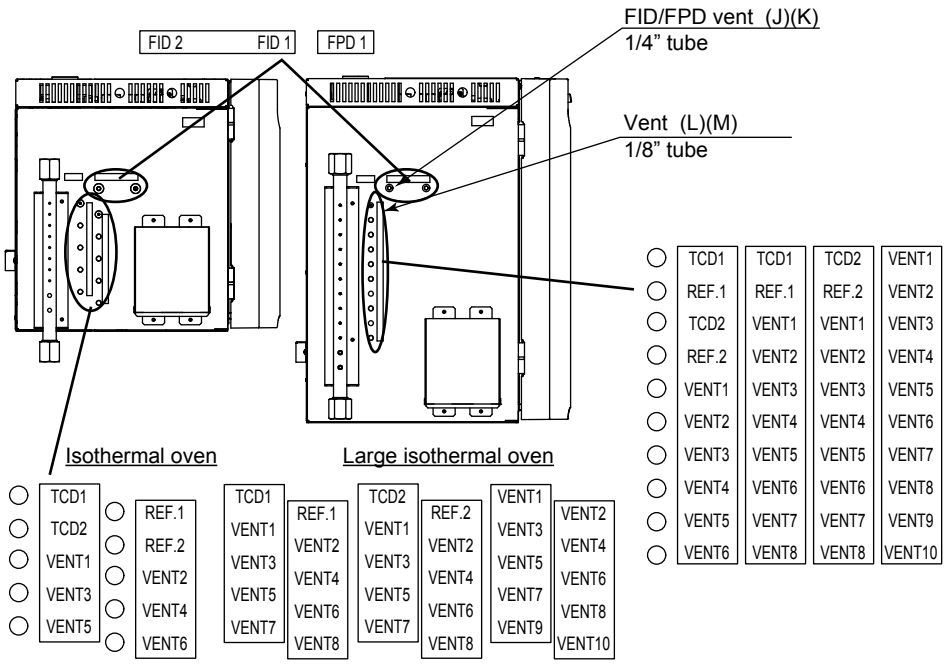


Figure 2.8 Left side of isothermal oven and large isothermal oven

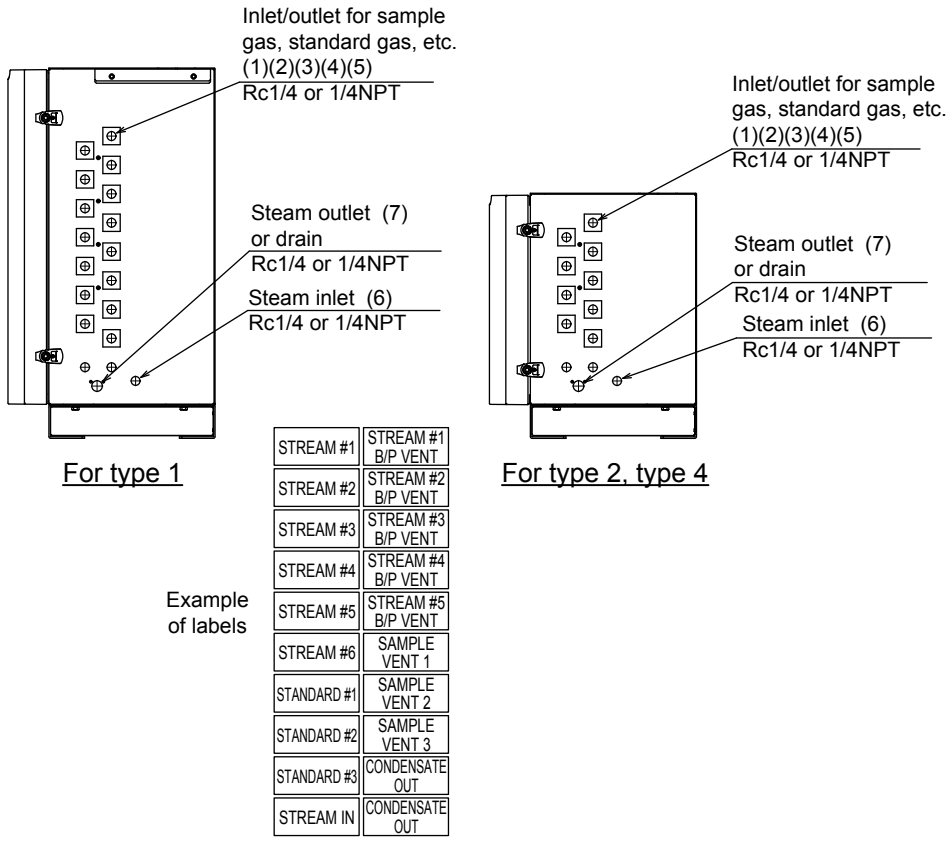

Inlet/outlet for sample gas, standard gas, etc. (1)(2)(3)(4)(5) Rc1/4 or 1/4NPT
Steam outlet (7) or drain Rc1/4 or 1/4NPT
Steam inlet (6) Rc1/4 or 1/4NPT
For type 1
Inlet/outlet for sample gas, standard gas, etc. (1)(2)(3)(4)(5) Rc1/4 or 1/4NPT
Steam outlet (7) or drain Rc1/4 or 1/4NPT
Steam inlet (6) Rc1/4 or 1/4NPT
For type 2, type 4
Example of labels
STREAM #1 STREAM #1 B/P VENT
STREAM #2 STREAM #2 B/P VENT
STREAM #3 STREAM #3 B/P VENT
STREAM #4 STREAM #4 B/P VENT
STREAM #5 STREAM #5 B/P VENT
STREAM #6 SAMPLE VENT 1
STANDARD #1 SAMPLE VENT 2
STANDARD #2 SAMPLE VENT 3
STANDARD #3 CONDENSATE OUT
STREAM IN CONDENSATE OUT

Figure 2.9 Analyzer base sampling unit (GCSMP)

2.2.2 Connecting Piping

For connection, refer to "1.2 External Dimensions."

For the user-specific connection, refer to "Operation Data."

(a) Sample inlet pipes

These are pipes to lead samples from process lines or an external sampling system into analyzer STREAMS #1 to #12 or the sample inlet of the pressure control section.

The analyzer can analyze up to 31 sample streams. For more than 31 sample streams, an external sampling system is employed, which has a stream switching function. In this case, one sample inlet pipe is used to lead multiple samples into the analyzer. When providing more than one pipe, see the “Operation Data” so that the specified sample can flow into the analyzer from the designated inlet port. STREAM and No. are marked at the piping port.

Use stainless steel of O.D. 6 mm or 1/4 inch with any oil cleaned off.

(b) Standard sample inlet pipes

These are pipes between the outlets of pressure regulators for standard gas cylinders and STANDARD #1 to #3 ports of the analyzer.

When different standard gases are used, provide separate pipes for each gas to lead them into the analyzer.

Use stainless steel of O.D. 6 mm or 1/4 inch with any oil cleaned off.

(c) Carrier gas inlet pipes

These are pipes to introduce the carrier gas to the analyzer between the outlets of carrier gas cylinder pressure regulators and CARRIER IN ports of the analyzer.

When two different carrier gases are used, provide separate pipes for each gas to lead them into the analyzer.

The following is recommended. By arranging the two gas cylinders in this way, there is no contamination of air.

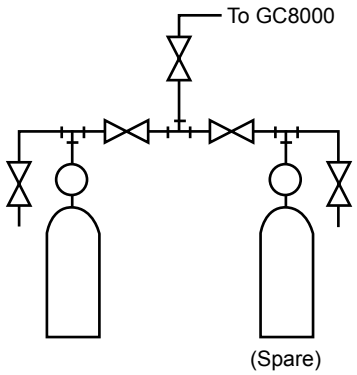


Figure 2.10

Confirm that the insides of the pipes and pipe fittings are not contaminated.

Confirm that the piping connections are done with no leakage.

WARNING

The following explosionproof requirements must be satisfied for hydrogen gas.

- No leakage
- Supply hydrogen gas to the analyzer at 500 ±20 kPa.

If the carrier gas contains moisture with a dew point of –60°C or above, it is recommended that a desiccant, such as a molecular sieve, be used to remove moisture to prevent deterioration of the columns.

Use stainless steel of O.D. 6 mm or 1/4 inch with any oil cleaned off.

CAUTION

Do not use solvents containing impurities such as non-volatile components to clean the inside of the pipes. They will contaminate the inside of the pipes and prevent correct analysis. If it is necessary to use a solvent for cleaning, use highly pure acetone.

(d) Instrument air pipe

These are the pipes for supplying air to the analyzer for actuating sampling and backflush valves and for purging the inside of the electronics section and the ovens.

An air pressure of 350 to 900 kPa (500 to 900 kPa for FPD) is required. Use general instrument air as the source and do the piping to the analyzer PURGE AIR port. A pressure regulator should be installed in-between.

Use stainless steel pipe of O.D.1/2 inch or more with any oil cleaned off.

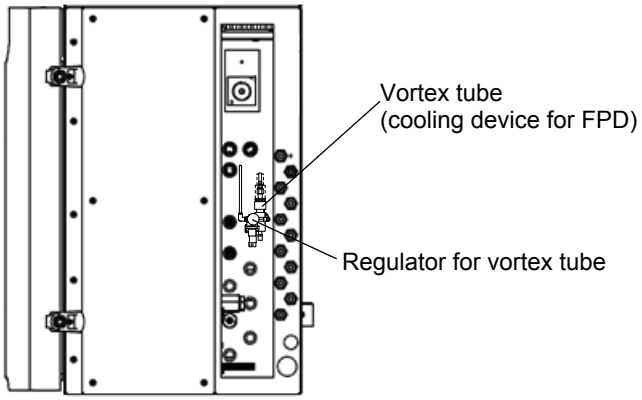


Figure 2.11 Pressure and flow control section of the large isothermal oven

Air pressure set value of the regulator is depended on the source air temperature and need to tune the setting value.

(e) Piping combustion air for FID/FPD

The FID/FPD air must not contain impurities that have an adverse effect on the analyzed results. Use an air supply meeting the above condition and do the piping between this supply and the analyzer BURNER AIR port.

Use stainless steel of O.D. 6 mm or 1/4 inch with any oil cleaned off.

(f) Piping combustion hydrogen gas for FID/FPD

Connect the piping between the outlet of the pressure regulator of a hydrogen gas cylinder and the analyzer BURNER FUEL port. Supply it at 500 ±20 kPa to meet the explosionproof requirements.

Use stainless steel of O.D. 6 mm or 1/4 inch with any oil cleaned off.

(g) Steam pipe

This is necessary for heating the sample with steam.

Connect the piping between a steam supply that can provide the required pressure (see Operation Data) and the analyzer STEAM IN port.

(h) Venting pipes

These are used for backflush venting, foreflush venting, detector venting, etc. With a vent header, the piping is provided. Without a vent stack, install piping to the vent stack.

Use large pipes for venting to minimize pressure losses.

Connect venting pipes of 1/4 inch for FID/FPD or 1/8 inch for others to about a 2-inch header.

When ejector suction is used in the sample outlet system, connect the venting pipes to the downstream of the vent header with a pipe of I.D. 10 mm or more.

CAUTION

Please keep safety in mind because the sample vent is usually open to the atmosphere.

When the sample vent is connected to the flare stack, please consider the pressure and the flow rate of the stack.

(i) Steam drain pipe

This is used to drain the condensate of the steam for heating the sample.

Connect the piping from the steam trap of the analyzer and also from the condensate drain piping port (CONDENSATE OUT), if provided, to the drain pit on the down-grade.

(j) Pipes for external valves

These are used for piping between the analyzer valve actuating pneumatic outlet and the external sampling system to actuate the stream valves and atmospheric balance valves provided in the external sampling system. Connect the piping properly according to the piping diagram.

Use stainless steel of O.D. 6 mm or 1/4 inch.

2.3 Wiring

See “1.1 Wiring and Piping Diagram” for wiring.

Note that the specifications determines the number of the protection system, which results in different wiring.

Table 2.3 Number of protection system

Explosionproof Specifications	Type 1 (100)	Type 2 (120)		Type 3 (222)	Type 4 (230)
		100 V (-A, B, C, D)	200 V (-E, F, G, H)		
TIIS (-T)	1	2	1	2	2
FM-X (-F), CSA-X (-C)	1	2	1	2	2
FM-Y (-G), CSA-Y (-D)	0				
ATEX (-A)	1	2	1	2	2
IECEx (-E)	1	2	1	2	2
NEPSI (-P)	1	2	1	2	2

( ): Suffix codes

WARNING

In case of TIIS-certified wiring, the attached cable packing adapters or sealing fitting must be used.

Otherwise, it does not comply with TIIS regulation.

CAUTION

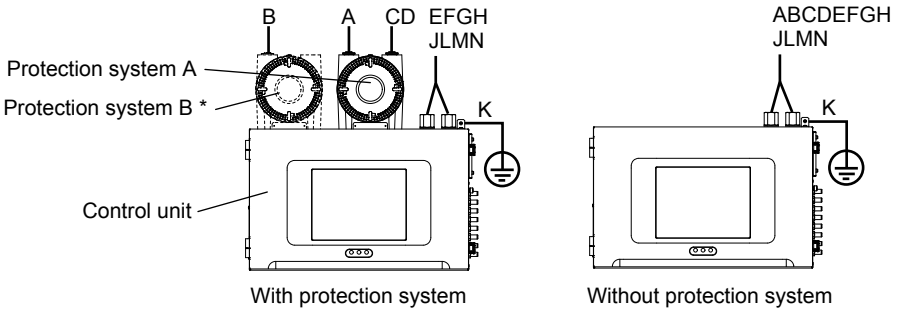
- Lay the signal wiring and electrical wiring in separate conduit pipes or ducts.
- Use independent grounding with a grounding resistance of 100 ohms or less.

2.3.1 Types of Wiring and Locations

The following types of wiring are required for the GC8000.

The wiring required varies with the specifications.

(A) Electric circuit and heater power
(B) Heater power
(C) Contact output for system alarm 1
(D) Contact output for annunciator
(E) Analog input (4 to 20 mA)
(F) Contact input (Operation start/stop, mode-selection request, etc.)
(G) Contact output
(H) Communication wiring (RS-422 and analyzer bus)
(J) Analog output (4 to 20 mA), Analog hold output
(K) Grounding
(L) External I/O cutoff output (Power cutoff signal)
(M) Ethernet (twisted-pair cable)
(N) Ethernet (optic fiber cable)



* Protection system B is equipped in some specifications.

Figure 2.12 Cable connection locations

2.3.2 Recommended Cables

CAUTION

(C) to (L) cables:

Use heat-resistant cables with maximum allowable temperature of 80°C or higher.

(M) and (N) cables:

Required maximum allowable temperature of the cables depends on the temperature class of the instrument and the actual ambient temperature. Use cables with maximum allowable temperature shown in the table below.

Temperature Class	T1, T2	T3	T4	Maximum allowable temperature of cable
Ambient temp.	Up to 30°C	Up to 35°C	Up to 40°C	60°C
	31 to 36°C	36 to 40°C	41 to 45°C	65°C
	37 to 43°C	41 to 45°C	46 to 50°C	70°C
	44 to 50°C	46 to 50°C		75°C

Table 2.4

Wiring Connections	Cable Inlet	Cable O.D. (for TIIS)	Wiring	Cable Condition	Terminal	Cable Shield
Protection system	A (right): 2 B (left): 1	ø8.0 to 16.0 mm	Protection system A: (A) Electric circuit and heater power Protection system B: (B) Heater power	3.5 to 5.5 mm^2 max. 1.25 to 5.5 mm^2 max.	M4 screw crimp-on terminal	Not required
			(C) Contact output for system alarm 1 (D) Contact output for annunciator	0.75 to 1.5 mm^2 max. Cable length 1 km max.	For MKKDSN (Note 3)	Required
Electronics section	6 (Junction box as needed)	ø9.0 to 16.0 mm	Without protection system: (A) Electric circuit and heater power (B) Heater power	3.5 to 5.5 mm^2 max. 1.25 to 5.5 mm^2 max.	M4 screw crimp-on terminal	Not required
			Without protection system: (C) Contact output for system alarm 1 (D) Contact output for annunciator	0.75 to 1.5 mm^2 max. Cable length 1 km max.	For FKC (Note 3)	Required
			(E) Analog input (16 points max.)			
			(F) Contact input (32 points max.)			
			(G) Contact output (Note 1) (20 points max.)			
			(H) Serial communication (Note 2)			
			(J) Analog output (32 points max.)	0.5 to 1.5 mm^2 max. Cable length 1 km max.	For FKC (Note 3)	Required
			(K) Grounding	5.5 mm^2 or more Grounding resistance of 100 ohms max.	M4 screw crimp-on terminal	Not required
			(L) External I/O cutoff output (Power cutoff signal)	0.75 to 1.5 mm^2 max. Cable length 1 km max. Twisted-pair cable	For FKC (Note 3)	Required
		NA (use sealing fitting)	(M) Ethernet (shielded twisted-pair cable)	CAT.5/CAT.5E 50 m or less	RJ45	Required
			(N) Ethernet (fiber-optic cable)	For 1300 nm Outdoor type multi-mode of 50/125 µm or 62.5/125 µm	SC	

Note 1: Use double-isolation cables for the contact output line (AC).
Double-isolate either contact output line (AC) or (DC) if they are mixed.
Note 2: Twisted pair cable is recommended.
Note 3: Use MKKDSN series terminals (manufactured by Phoenix Contact Ltd.) for the protection system, and FKC series terminals (manufactured by Phoenix Contact Ltd.) for the electric circuit except for the power or Ethernet line. For these wiring connections, use AI series crimp-on terminals manufactured by the same company. Four types of crimp-on terminals are used according to the wire diameters (see Table 2.5).

Table 2.5 Crimp-on terminals

Terminal Series	Cable Core	Cable O.D.	Terminal Type	Peel off length
MKKDSN	0.75 mm^2	Less than ø2.8 mm	AI 0.75-6GY	Approx. 6 mm
	1 mm^2	Less than ø3.0 mm	AI 1-6RD	
	1.5 mm^2	Less than ø3.4 mm	AI 1.5-6BK	
FKC	0.5 mm^2	Less than ø2.5 mm	AI 0.5-10WH	Approx. 10 mm
	0.75 mm^2	Less than ø2.8 mm	AI 0.75-10GY	
	1 mm^2	Less than ø3.0 mm	AI 1-10RD	
	1.5 mm^2	Less than ø3.4 mm	AI 1.5-10BK	

Contact Phoenix Contact Ltd. for details.

2.3.3 Preparing Wiring Depending on Specifications

Perform wiring carefully because the connection of wiring varies depending on the GC8000 explosionproof specifications.

IMPORTANT

Cables should be arranged in an orderly manner in the protection system.

Otherwise, they may damage the parts (e.g. relay).

FM

WARNING

- All wiring shall comply with National Electric Code ANSI/NFP A 70 and Local Electric Codes.
- In a hazardous area, use conduits for wiring in the explosionproof enclosure or to electronics sections.

CAUTION

- The unused electrical connection ports should be closed with an appropriate flameproof-certified plug.
- Analyzers have pressurized enclosures. The cable end should be sealed in order to apply pressure to the pressurized enclosure. Otherwise, power does not supplied to the electronics section.

In the FM-Y, all wiring must be connected to the electronics section since the protection system is not provided.

Six connection ports are provided in the electronics section. Use convenient ones.

Remove the attached plug of the connector and perform wiring.

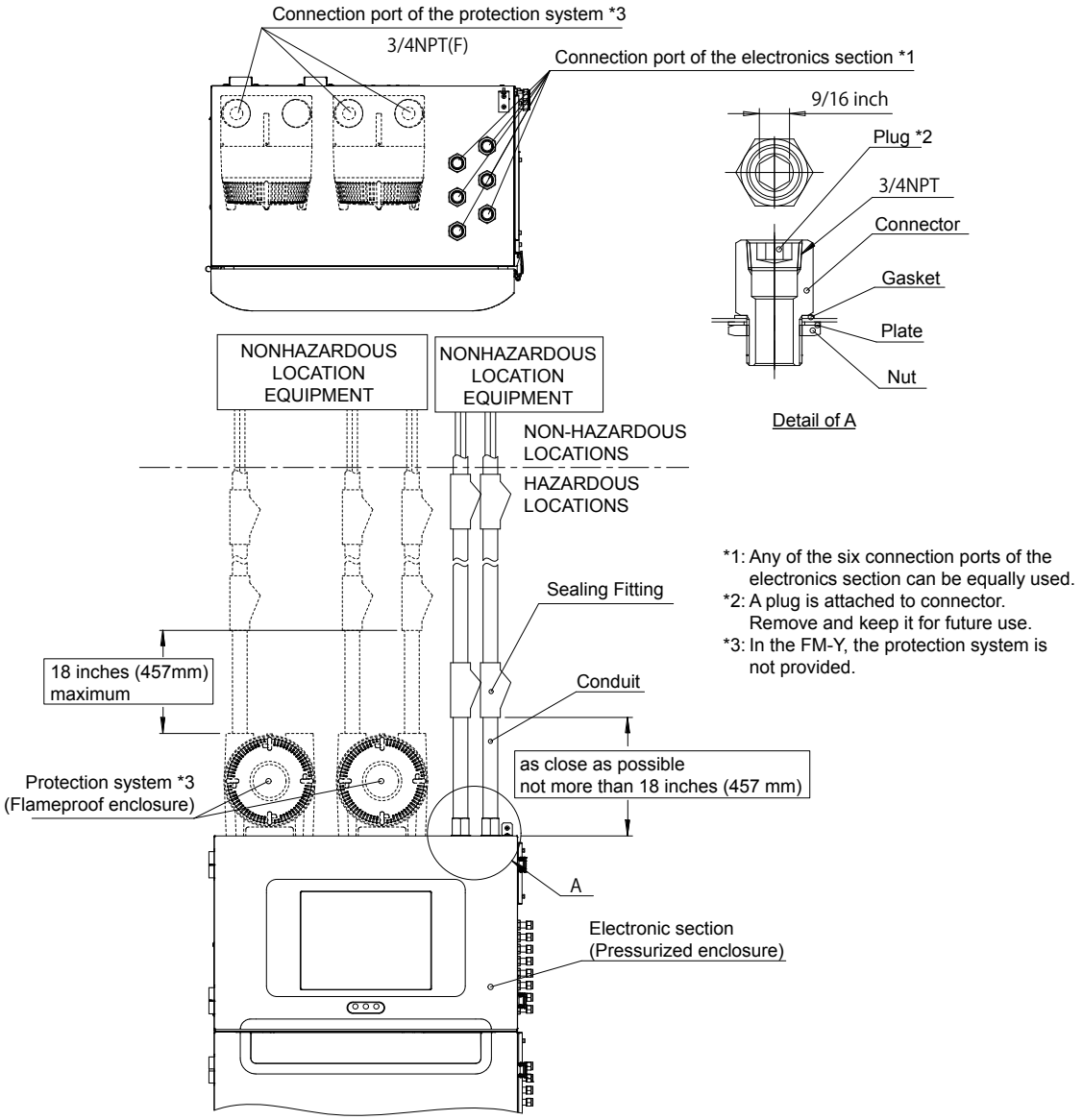

Connection port of the protection system *3
3/4NPT(F)
Connection port of the electronics section *1
9/16 inch
Plug *2
3/4NPT
Connector
Gasket
Plate
Nut
Detail of A
NONHAZARDOUS LOCATION EQUIPMENT
NONHAZARDOUS LOCATION EQUIPMENT
NON-HAZARDOUS LOCATIONS
HAZARDOUS LOCATIONS
*1: Any of the six connection ports of the electronics section can be equally used.
*2: A plug is attached to connector. Remove and keep it for future use.
*3: In the FM-Y, the protection system is not provided.
Sealing Fitting
18 inches (457mm) maximum
Conduit
as close as possible not more than 18 inches (457 mm)
Protection system *3 (Flameproof enclosure)
A
Electronic section (Pressurized enclosure)

Figure 2.13 Wiring in FM specification

CSA

WARNING

- All wiring shall comply with Canadian Electric Code C22.1 and Local Electric Codes.
- In a hazardous area, use conduits for wiring in the explosionproof enclosure or to electronics sections.

CAUTION

- The unused electrical connection ports should be closed with an appropriate flameproof-certified plug.
- Analyzers have pressurized enclosures. The cable end should be sealed in order to apply pressure to the pressurized enclosure. Otherwise, power does not supplied to the electronics section.

In the CSA-Y, all wiring must be connected to the electronics section since the protection system is not provided.

Six connection ports are provided in the electronics section. Use convenient ones.

Remove the attached plug of the connector and perform wiring.

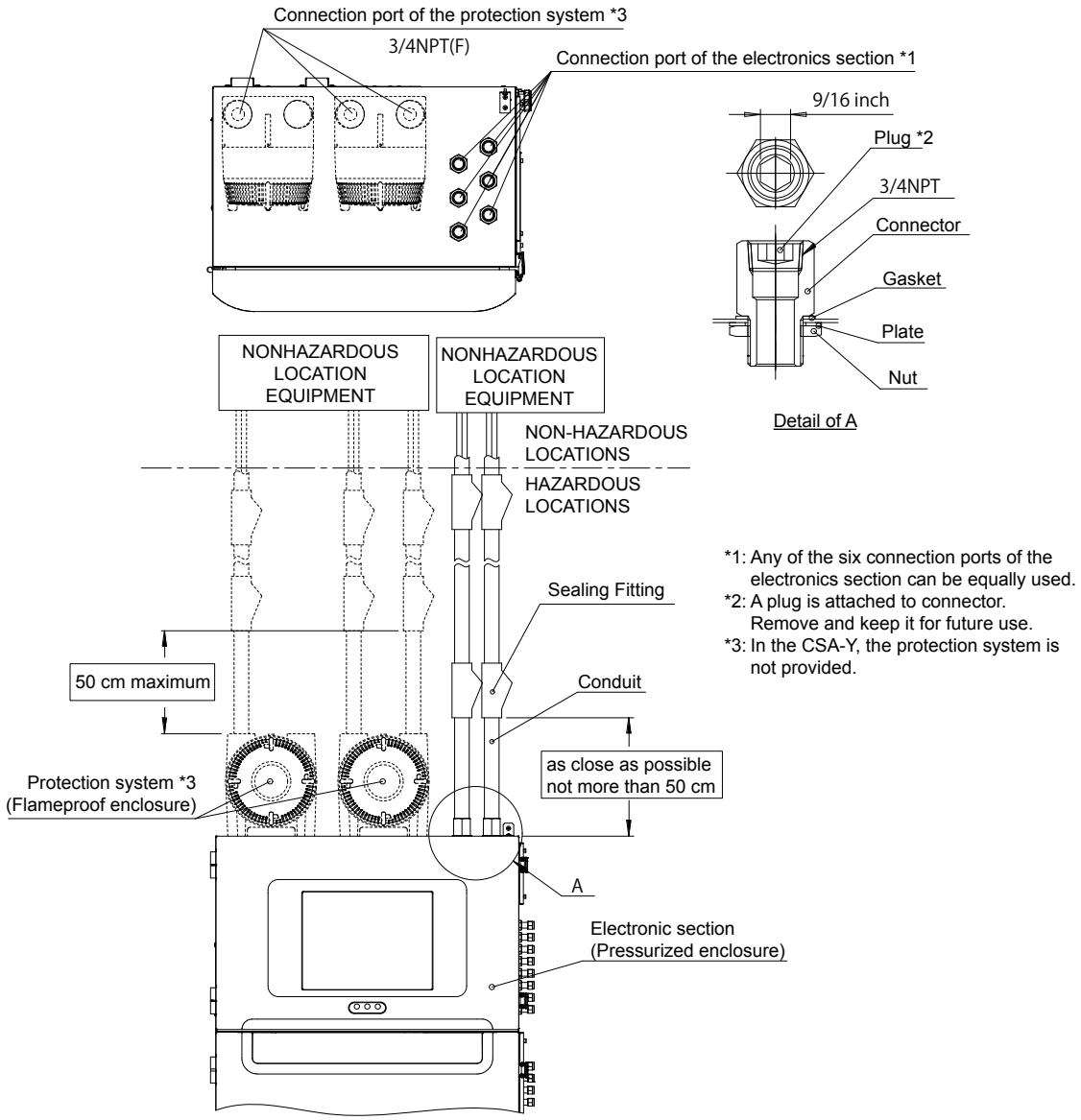

Connection port of the protection system *3
3/4NPT(F)
Connection port of the electronics section *1
9/16 inch
Plug *2
3/4NPT
Connector
Gasket
Plate
Nut
Detail of A
NONHAZARDOUS LOCATION EQUIPMENT
NONHAZARDOUS LOCATION EQUIPMENT
NON-HAZARDOUS LOCATIONS
HAZARDOUS LOCATIONS
Sealing Fitting
Conduit
50 cm maximum
as close as possible not more than 50 cm
Protection system *3 (Flameproof enclosure)
A
Electronic section (Pressurized enclosure)
*1: Any of the six connection ports of the electronics section can be equally used.
*2: A plug is attached to connector. Remove and keep it for future use.
*3: In the CSA-Y, the protection system is not provided.

Figure 2.14 Wiring in CSA specification

ATEX, IECEx, NEPSI

WARNING

- All wiring shall comply with Local Electric Codes and Requirements.
- In a hazardous area, use appropriate flameproof-certified parts for connecting cables.
- All externally powered input signals into the pressurized enclosure shall be isolated by external relays controlled by the Ex px protection system(Ex px safety device).

CAUTION

- The unused electrical connection ports should be closed with an appropriate flameproof-certified plug.
- The blind plug shall not be used with an adapter.
- Analyzers have pressurized enclosures. The cable end should be sealed in order to apply pressure to the pressurized enclosure. Otherwise, power does not supplied to the electronics section.

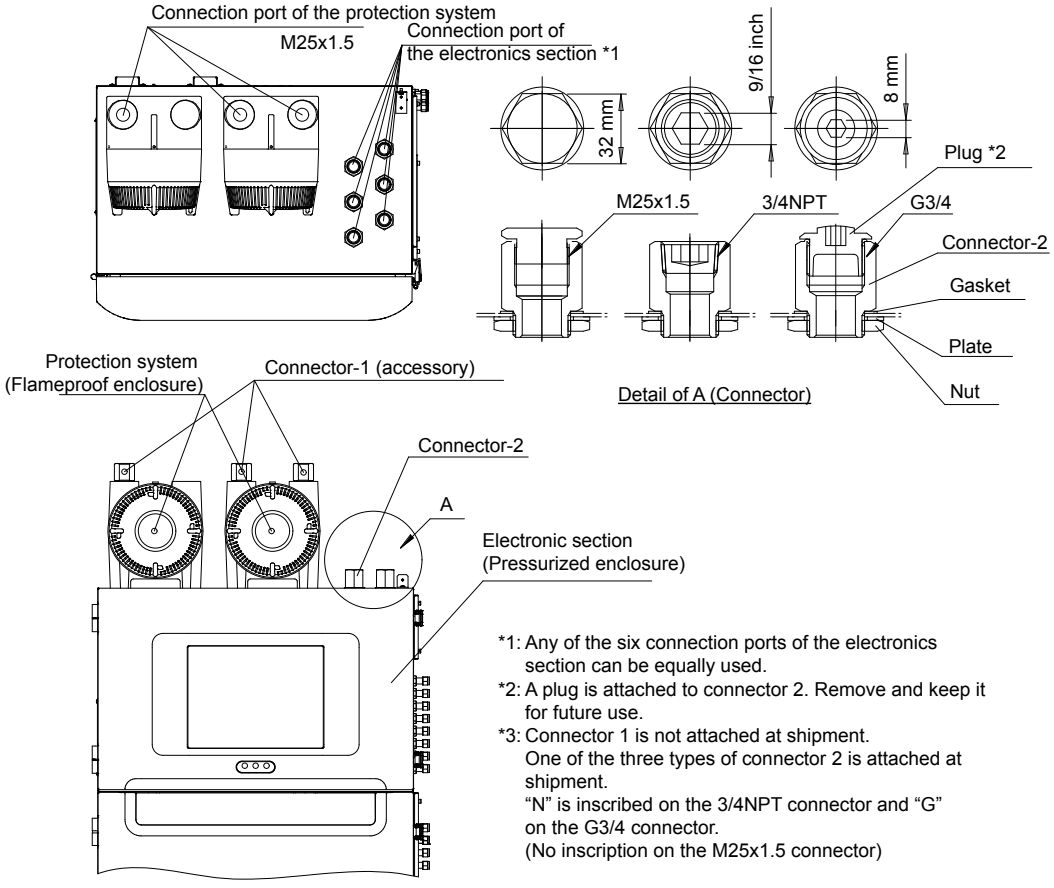


Figure 2.15 Wiring in ATEX, IECEx or NEPSI specification

Connection port for the protection system

Remove the attached plug and perform wiring.

For the 3/4NPT or G3/4 connection port, use the connectors in the accessory kit.

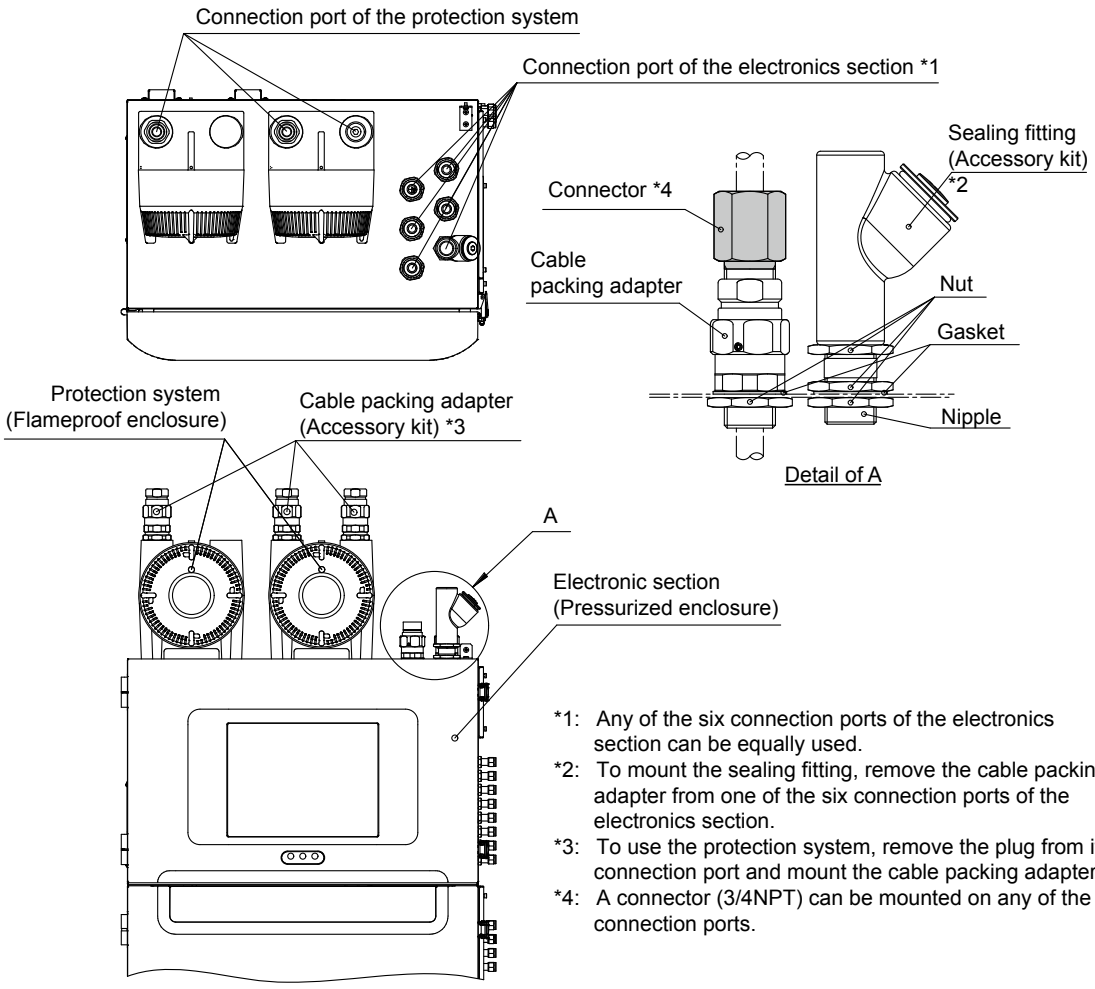
Connection port for the electronics section

Six connection ports are provided in the electronics section. Use convenient ones.

Remove the attached plug of the connector and perform wiring.

TIIS

For TIIS explosionproof wiring connections, use cable packing adapters or sealing fittings (for Ethernet cable).



*1: Any of the six connection ports of the electronics section can be equally used.
*2: To mount the sealing fitting, remove the cable packing adapter from one of the six connection ports of the electronics section.
*3: To use the protection system, remove the plug from its connection port and mount the cable packing adapter.
*4: A connector (3/4NPT) can be mounted on any of the connection ports.

Figure 2.16 Wiring in TIIS specification

Connecting cables to the protection system

Remove the attached plug and mount the cable packing adapter (G3/4) in the accessory kit on the connection port. Use the connector in the accessory kit for the cable packing adapter (3/4NPT).

CAUTION

The minimum packing (for ø8.0 to ø9.0) is attached to the cable packing adapters at shipment. Change it to an appropriate packing for the cable O.D. (See Table 2.6.)

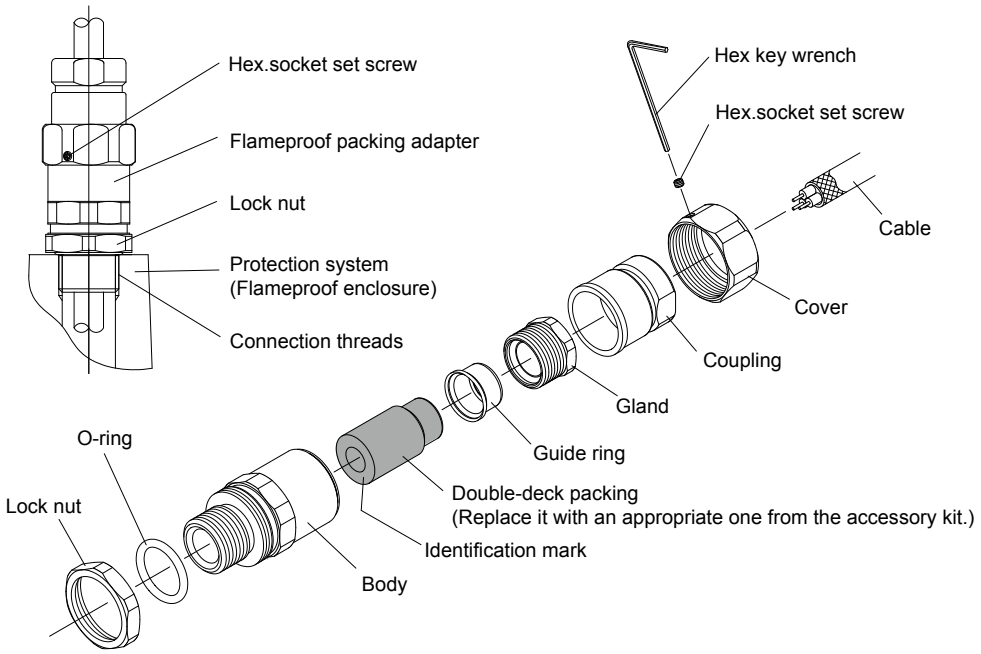


Figure 2.17 Procedure for mounting a cable packing adapter for a protection system

The cable packing adapters comply with the Technical Standard of the Ministry of Health, Labour and Welfare, Japan.

Table 2.6 Size of double-deck packing for the protection system

Connection port screw	Applicable cable O.D.	Identification mark	Recommended torque for the gland (N·m)
G3/4	ø8.0 to ø9.0	SFFP209 ø8.0 to ø9.0	17
	ø9.0 to ø10.0	SFFP2010 ø9.0 to ø10.0	25
	ø10.0 to ø11.0	SFFP2011 ø10.0 to ø11.0	20
	ø11.0 to ø12.0	SFFP2012 ø11.0 to ø12.0	20
	ø12.0 to ø13.0	SFFP2013 ø12.0 to ø13.0	20
	ø13.0 to ø14.0	SFFP2014 ø13.0 to ø14.0	25
	ø14.0 to ø15.0	SFFP2015 ø14.0 to ø15.0	20
	ø15.0 to ø16.0	SFFP2016 ø15.0 to ø16.0	20

*: When a cable O.D. falls under two categories, try both and choose the more suitable one.

Connecting cables to the electronics section

Six connection ports are provided in the electronics section. Use convenient ones.

The cable packing adapters (G3/4) and plates for sealing are mounted as standard. Remove the plate before using the port for wiring, and keep it for future use. (Do not remove the plate for the unused connection port.)

CAUTION

The minimum packing (for ø9.0 to ø10.0) is attached to the cable packing adapters at shipment. Change it to an appropriate packing for the cable O.D. (See Table 2.7.)

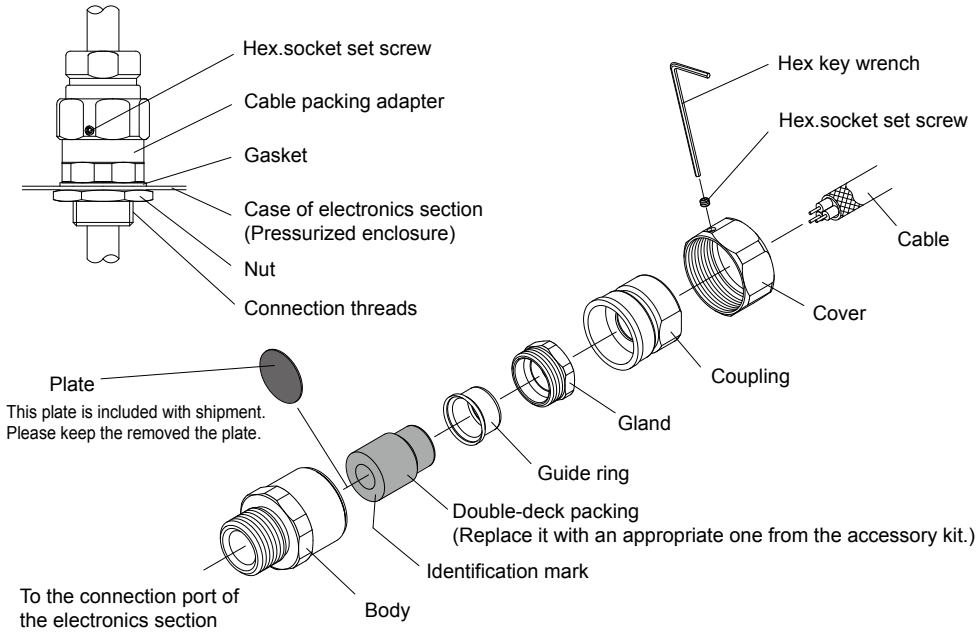


Figure 2.18 Procedure for mounting a cable packing adapter for the electronics section

The cable packing adapters comply with the Technical Standard of the Ministry of Health, Labour and Welfare, Japan.

Table 2.7 Double-deck packing size for electronics section

Connection port screw	Applicable cable O.D.	Identification mark	Recommended torque for the gland (N·m)
G3/4	ø9.0 to ø10.0	SCFP2010 ø9.0 to ø10.0	25
	ø10.0 to ø11.0	SCFP2011 ø10.0 to ø11.0	20
	ø11.0 to ø12.0	SCFP2012 ø11.0 to ø12.0	20
	ø12.0 to ø13.0	SCFP2013 ø12.0 to ø13.0	20
	ø13.0 to ø14.0	SCFP2014 ø13.0 to ø14.0	25
	ø14.0 to ø15.0	SCFP2015 ø14.0 to ø15.0	20
	ø15.0 to ø16.0	SCFP2016 ø15.0 to ø16.0	20

*: When a cable O.D. falls under two categories, try both and choose the more suitable one.

For Ethernet cable, use sealing fittings in the accessories kit for the connection port (see Figure 2.19). Remove the attached cable packing adapter and mount the sealing fitting back in place. Six connection ports are provided in the electronics section. Use convenient ones.

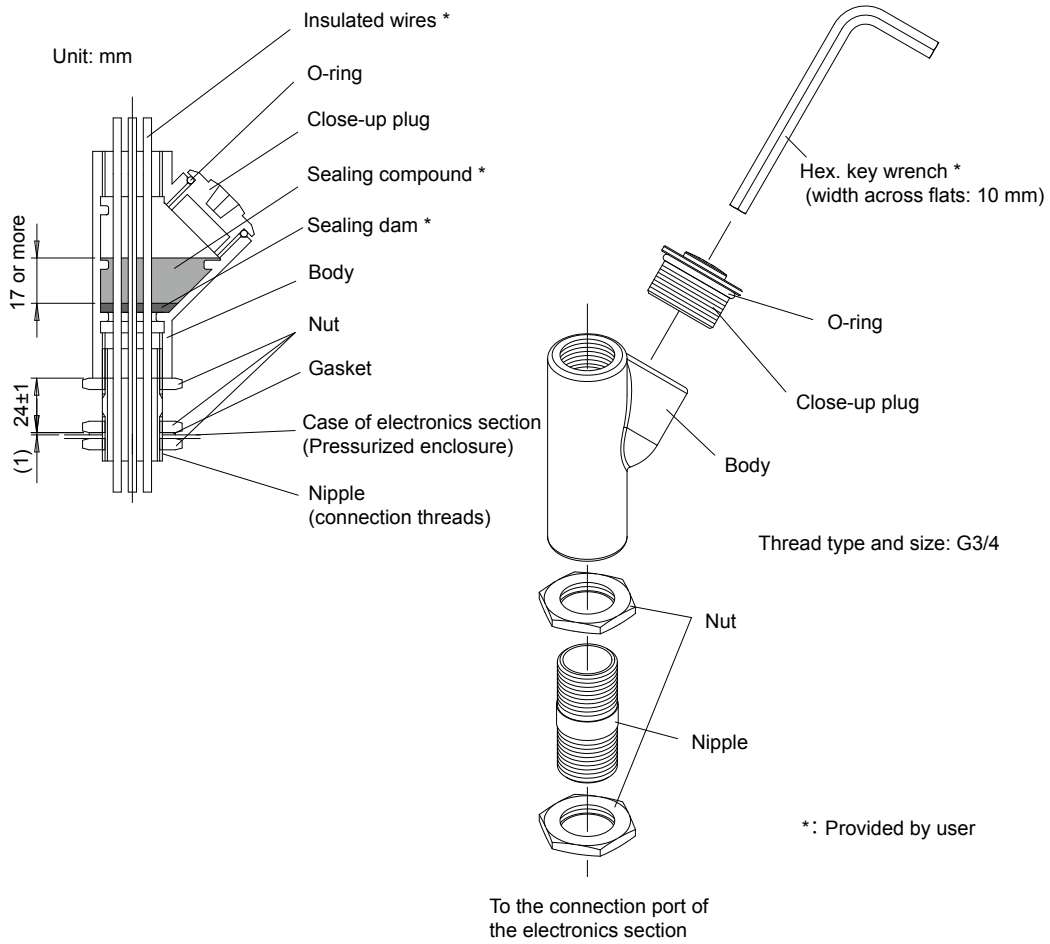


Figure 2.19 Mounting procedure for sealing fitting (accessory)

CAUTION

The cable end should be sealed in order to apply pressure to the electronics section. Otherwise, power does not be supplied to the electronics section.

For the 3/4NPT connection port, use the connectors in the accessory kit to all of the connections.

TIP

Refer to “USERS’ GUIDELINES for Electrical Installations for Explosive Gas Atmospheres in General Industry” for more details.

2.3.4 Connecting Power Cable and Grounding

CAUTION

- Wire the power supply cable keeping the distance of 1 cm or more from other signal wires.
- The power supply cable shall comply with UL or CSA.
- Do wiring after securing protective grounding.

Use crimp-on terminals for all power cables and grounding (see Figure 2.20).
Use crimp-on terminals suitable for the cable core (see Table 2.8).

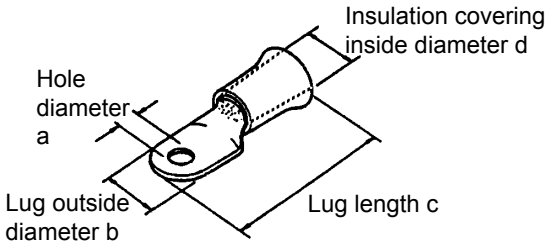


Figure 2.20 Crimp-on terminal

Table 2.8 Size of crimp-on terminal

Nominal cross sectional area	Screw (mm)	Hole diameter a (mm)	Outside diameter b (mm)	Length c (mm)	Insulation covering inside diameter d (mm)	Applicable terminal*
5.5 mm^2	4	4 to 5	9.8 or less	25 to 29	5.8 or less	AMP 170785-1 JST 5.5-4
2.0 mm^2	4	4.3 or more	8.7 or less	approx. 21	5.8 or less	AMP 170782-1 JST V2-4
1.25 mm^2	4	4.3 or more	8.7 or less	approx. 21	5.8 or less	AMP 170782-1 JST V1.25-4

*: AMP: Japan AMP Co., Ltd.
JST: JST Co., Ltd.

Power supply line to the protection system (A) (B)

The power supply to protection system A is used for both heater power and electric circuit power.
The power supply or protection system B is used only for heater power.
Connect the attached ferrite core for ATEX, IECEx or NEPSI.
Grounding must be wired.
Please do not forget to put protection-film cover, after wiring is finished.

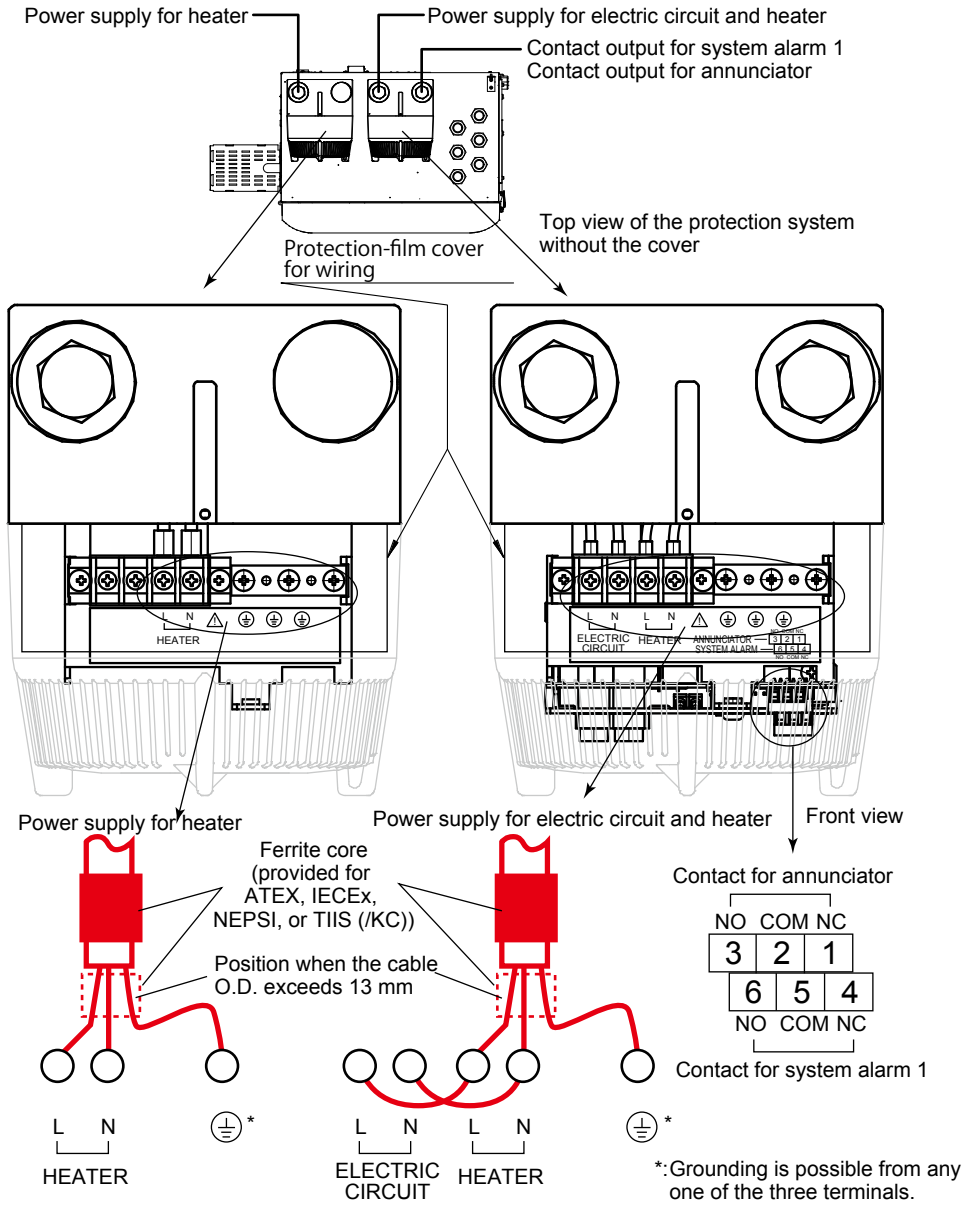


Figure 2.21

CAUTION

Use heat-resistant cables with maximum allowable temperature of 80°C or above.

● Power supply line of the electronics section (A) (B) without the protection system

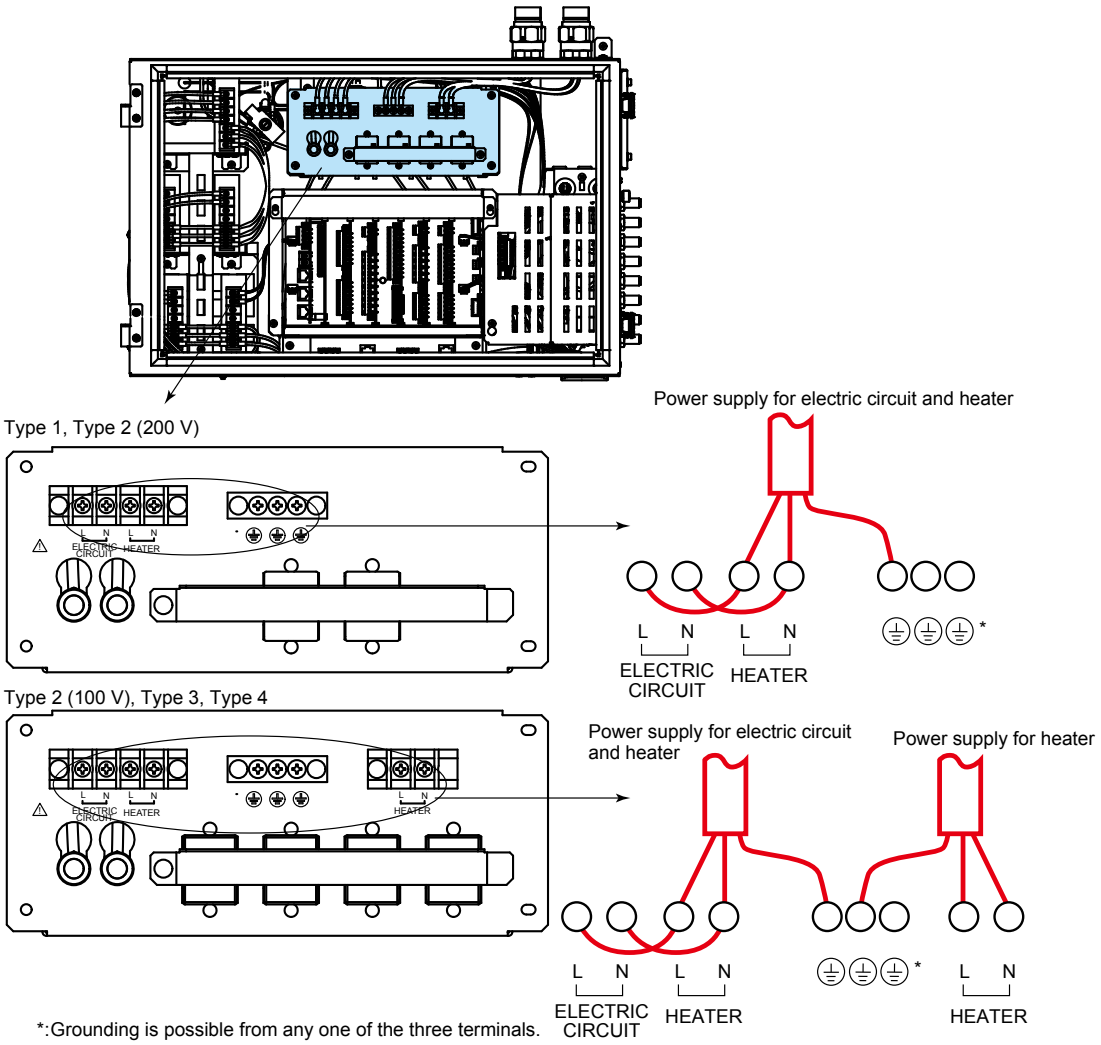

Power supply for electric circuit and heater
Type 1, Type 2 (200 V)
L N L N
ELECTRIC CIRCUIT HEATER
Type 2 (100 V), Type 3, Type 4
Power supply for electric circuit and heater
Power supply for heater
*:Grounding is possible from any one of the three terminals.

Figure 2.22

CAUTION

Use heat-resistant cables with maximum allowable temperature of 80°C or above.

● Grounding (K)

CAUTION

Use independent grounding with a grounding resistance of 100 ohms or less.

Connect the earth terminal to the upper right of the control unit as shown in Figure 2.23.

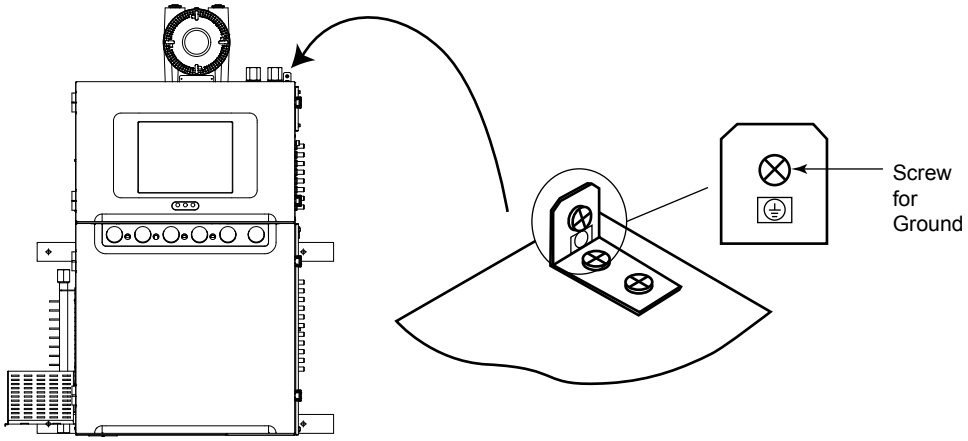


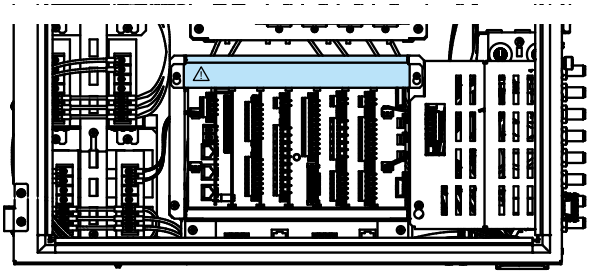
Figure 2.23 Earth terminal for the GC8000

2.3.5 Connecting Signal Cables

CAUTION

(C) to (L) cables:

Use heat-resistant cables with maximum allowable temperature of 80°C or higher.



(M) and (N) cables:

Required maximum allowable temperature of the cables depends on the temperature class of the instrument and the actual ambient temperature. Use cables with maximum allowable temperature shown in the table below.

Temperature Class	T1, T2	T3	T4	Maximum allowable temperature of cable
Ambient temp.	Up to 30°C	Up to 35°C	Up to 40°C	60°C
	31 to 36°C	36 to 40°C	41 to 45°C	65°C
	37 to 43°C	41 to 45°C	46 to 50°C	70°C
	44 to 50°C	46 to 50°C		75°C

CAUTION

Be sure to keep the power and signal cables apart. Avoid placing them in parallel.

NOTE

- For analog input, use twisted pair cables with a common shield (a twist pitch of 50 mm or less), to avoid induction noise.

  Use twisted pair cables for digital signals as well.
- Stranded cables are superior to single-conductor cables in the following respects:
  - Stranded cables are more flexible and easy to lay in a curved pit or cramped space.
  - Stranded cables provide better contact with crimp-on terminal, with less aging over time.
- Secure the cables so they do not weight on the terminals.
- Fasten the terminal screws securely.

Signal Cable Termination

CAUTION

- Use crimp-on terminal with insulated covering.
- Wire crimp-on terminal with the dedicated tool.
- The tool must be suitable for the size of wires.

Use crimp-on terminal for all signal cables.

The specifications of the crimp-on terminal are determined by the nominal cross sectional area of the power cable.

For the protection system, use MKKDSN series terminals from Phoenix Contact Ltd., and FKC series terminals from the same company for the contact output line (D) (G), analog input line (E), contact input line (F), serial communication line (H), analog output line (J), and explosionproof status line (L) of the electronics section.

For the Ethernet line (L) (M), use twisted pair cables of CAT.5 or CAT.5E or multi-mode optical fiber of 50/125 µm or 62.5/125 µm.

For these wiring connections, use AI series crimp-on terminal from Phoenix Contact Ltd.

There are four types of crimp-on terminal for respective wire diameters (see Table 2.5).

Peel off the cover of wire by 6 mm for MKKDSN series terminals and 10 mm for FKC series terminals (maker-recommended values).

CAUTION

- Parts such as the signal line, relay terminal, relay, and power supply to be connected to the contact input/output shall comply with IEC 61010 or CSA 61010.
- Connect wiring after securing protective grounding.

External I/O cutoff output (power cutoff signal) (L)

Wiring for the cutoff signal must be performed in case the explosionproof requirements are not satisfied.

The shield is grounded at the earth bar (see Figure 2.24). Remove the cover on the upper right of the electronics section and perform wiring.

Contact output for system alarm 1 (C) and contact output for annunciator (D)

The wiring locations differ depending on whether the protection system is provided or not.

Wiring to protection system A

Perform wiring to the terminals shown in Figure 2.21.

The MKKDSN series terminals from Phoenix Contact Ltd. are used.

For these wiring connections, use AI series crimp-on terminals from the same company. Check if the crimp-on terminals meet wire diameters in Table 2.5.

Wiring to the electronics section (without the protection system)

Perform wiring to the electronics section of the control unit (see Figure 2.24).

FKC series terminals from Phoenix Contact Ltd. are used.

For these wiring connections, use AI series crimp-on terminals from the same company. Check if the crimp-on terminals meet wire diameters in Table 2.5.

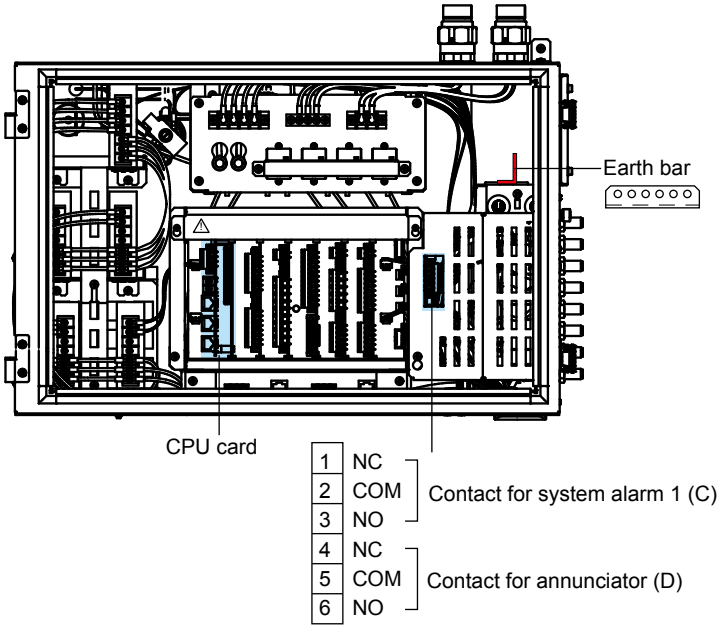


Figure 2.24

Ethernet (twisted pair) (M) (L)

CAUTION

(M) cable:

Required maximum allowable temperature of the cables depends on the temperature class of the instrument and the actual ambient temperature. Use cables with maximum allowable temperature shown in the table below.

Temperature Class	T1, T2	T3	T4	Maximum allowable temperature of cable
Ambient temp.	Up to 30°C	Up to 35°C	Up to 40°C	60°C
	31 to 36°C	36 to 40°C	41 to 45°C	65°C
	37 to 43°C	41 to 45°C	46 to 50°C	70°C
	44 to 50°C	46 to 50°C		75°C

Connect the twisted pair cable of the RJ-45 connector to the CPU card.

The CPU card is labeled “CTRL.CPU”.

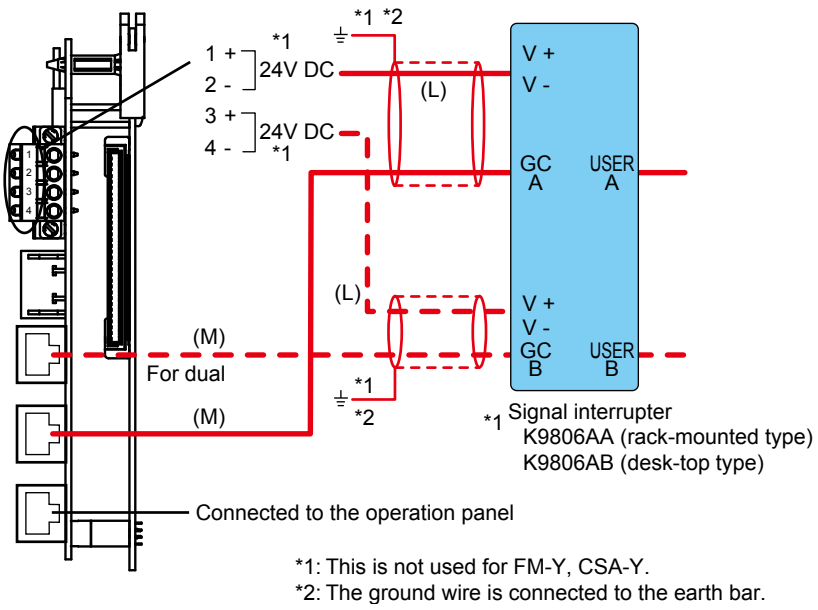


Figure 2.25 Ethernet (twisted pair cable)

The external I/O cutoff output (power cutoff signal) (L) is also wired.

The shield is grounded at the earth bar shown in Figure 2.24. Remove the cover on the upper right of the electronics section and perform wiring.

Ethernet (optical fiber) (N)

CAUTION

(N) cable:

Required maximum allowable temperature of the cables depends on the temperature class of the instrument and the actual ambient temperature. Use cables with maximum allowable temperature shown in the table below.

Temperature Class	T1, T2	T3	T4	Maximum allowable temperature of cable
Ambient temp.	Up to 30°C	Up to 35°C	Up to 40°C	60°C
	31 to 36°C	36 to 40°C	41 to 45°C	65°C
	37 to 43°C	41 to 45°C	46 to 50°C	70°C
	44 to 50°C	46 to 50°C		75°C

Connect an optical fiber to the media converter shown in Figure 2.26.

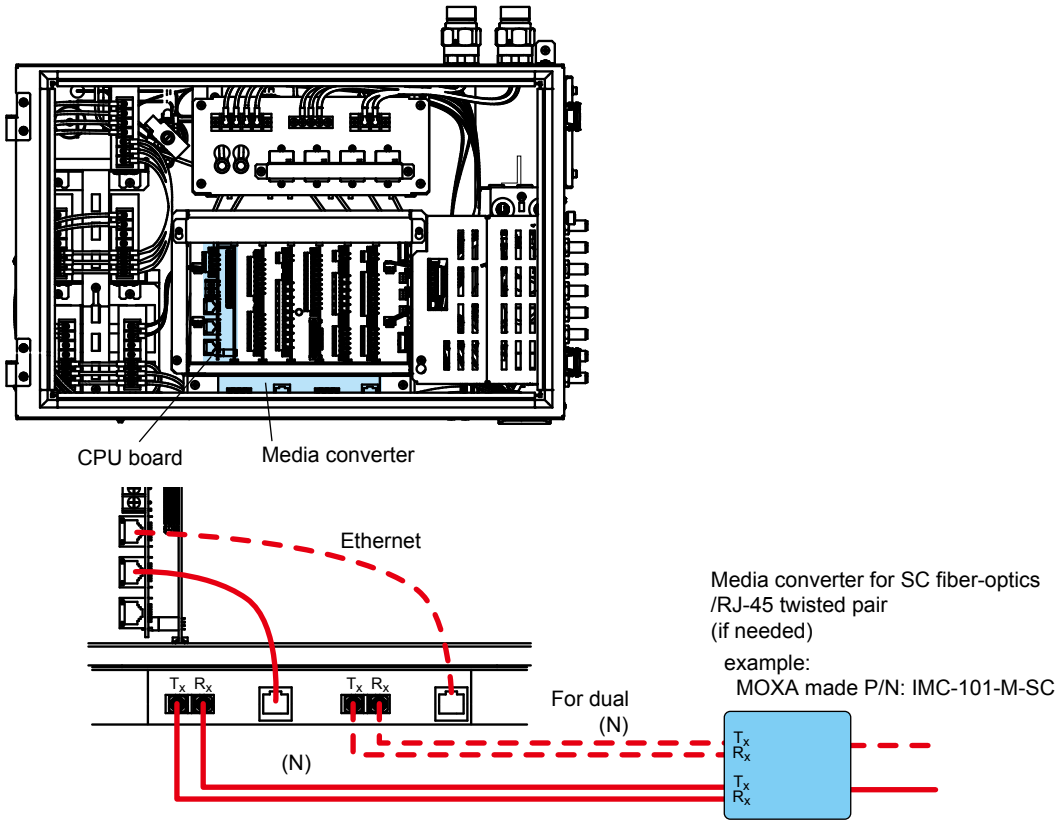


Figure 2.26 Ethernet (optical fiber)

Wiring to slots 1 to 5

Perform wiring to slots 1 to 5 for each card.

CAUTION

After the card is removed, return it to its original position. There is a label on the card.

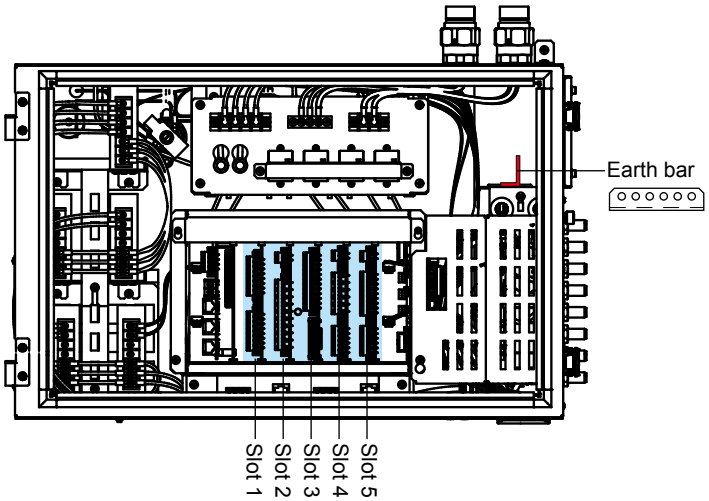
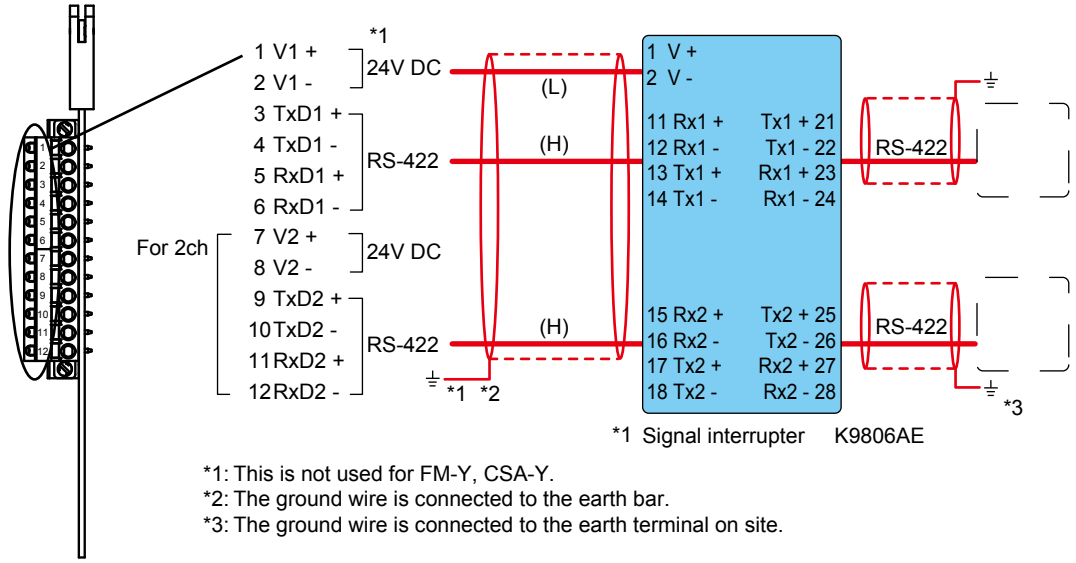


Figure 2.27

FKC series terminals from Phoenix Contact Ltd. are used.

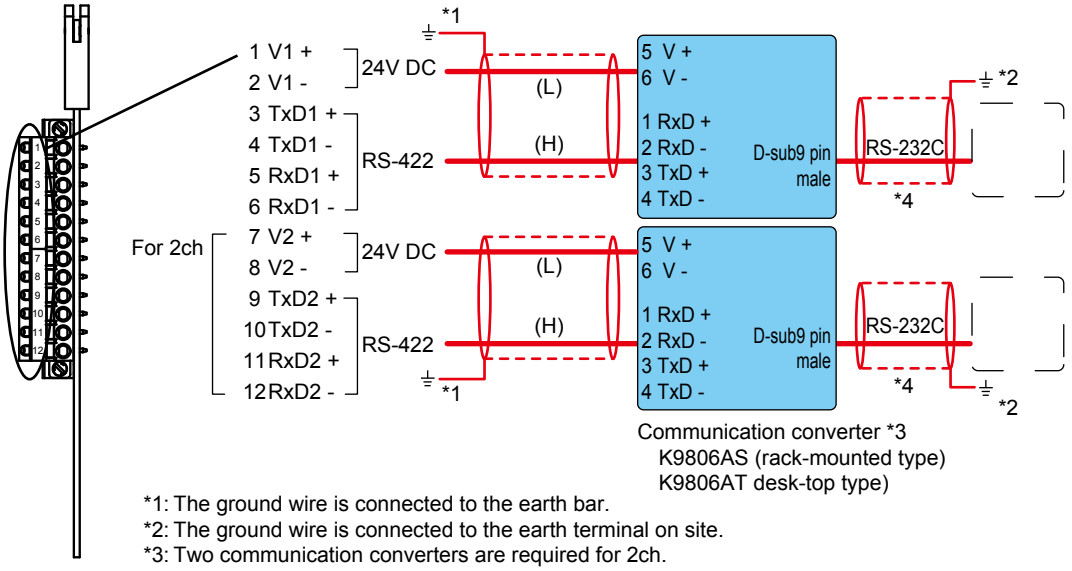
For these wiring connections, use AI series crimp-on terminals from the same company. Check if the crimp-on terminals meet wire diameters in Table 2.5.

Serial communication (1ch) (Code: C) and serial communication (2ch) (Code: D) (H) (L)



*1: This is not used for FM-Y, CSA-Y.
*2: The ground wire is connected to the earth bar.
*3: The ground wire is connected to the earth terminal on site.

Figure 2.28 Wiring for serial communication cards



*1: The ground wire is connected to the earth bar.
*2: The ground wire is connected to the earth terminal on site.
*3: Two communication converters are required for 2ch.
*4: (a) shows cable connection of RS-232C communication.
Please refer to the following for flow control setting.
RS control: None, DR check: YES (Recommended), CD check: None
If the instrument to be connected accepts NULL modem-type connection, wiring (b) is also applicable.
Example: Regular personal computers, “FA-M3” (Yokogawa PLC).

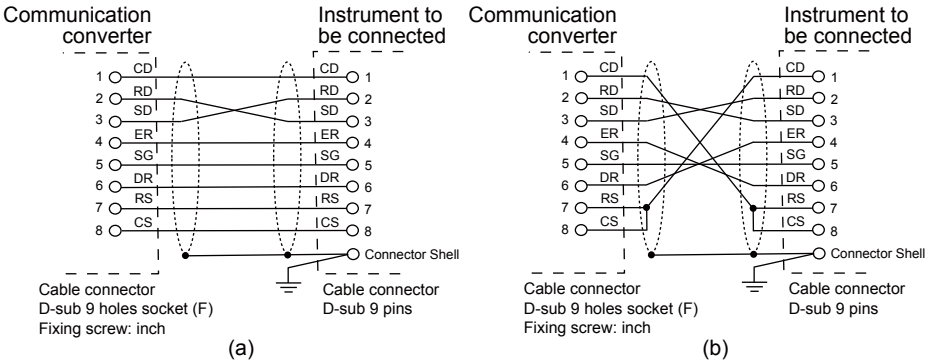


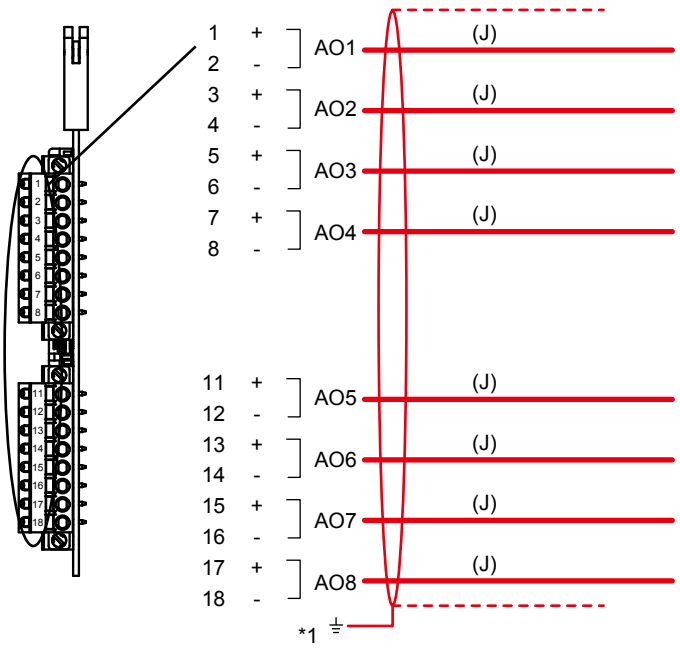
Figure 2.29 Wiring for serial communication cards

The serial communication card is labeled “COM”.

The external I/O cutoff output (power cutoff signal) (L) is also wired.

The shield is grounded at the earth bar in Figure 2.24. Remove the cover on the upper right of the electronics section and perform wiring.

Analog output (system isolation) (Code: 1) and analog output (channel isolation) (Code: 2) (J)

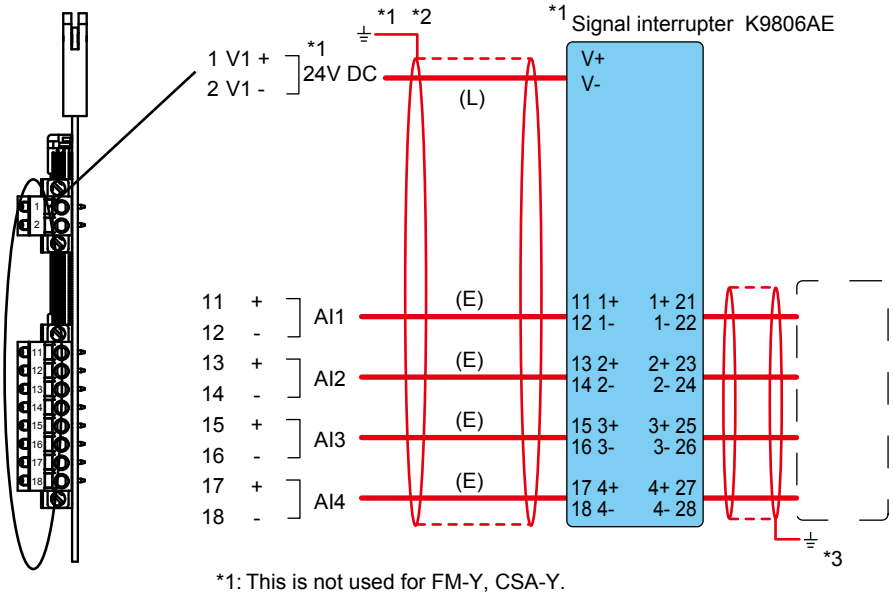


*1: The ground wire is connected to the earth bar.

Figure 2.30 Wiring for an analog output card

The analog output card is labeled “AO”.

Analog input (voltage) (Code: 3) and analog input (current) (Code: 4) (E) (L)



*1: This is not used for FM-Y, CSA-Y.
*2: The ground wire is connected to the earth bar.
*3: The ground wire is connected to the earth terminal on site.

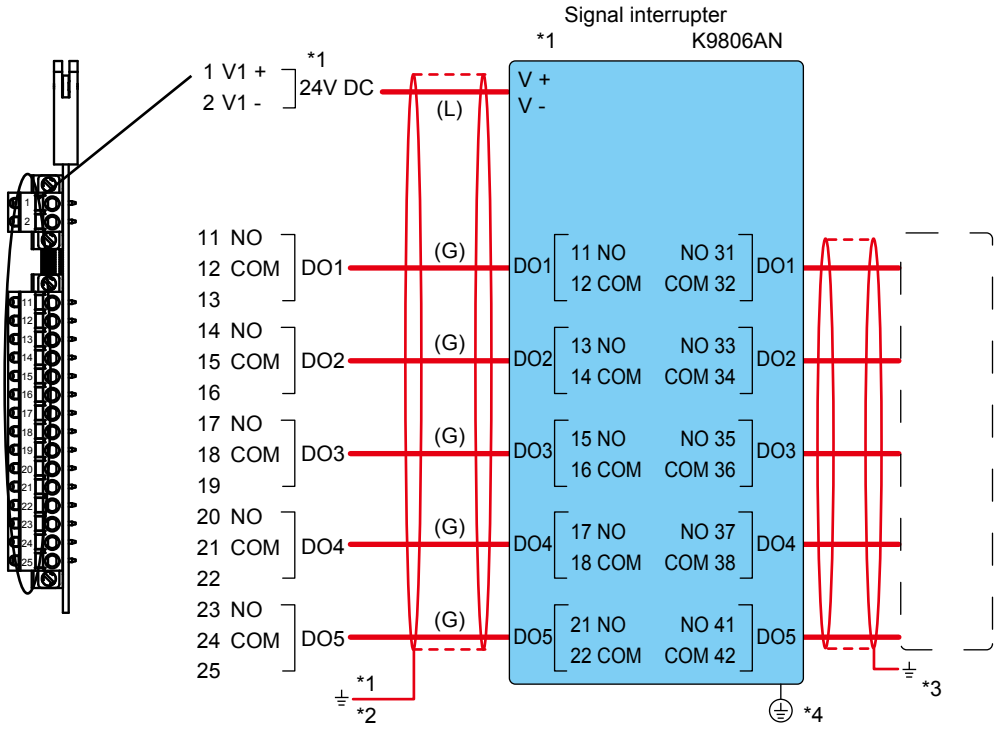
Figure 2.31 Wiring for an analog input card

The analog input card is labeled “AI”.

The external I/O cutoff output (power cutoff signal) (L) is also wired.

The shield is grounded at the earth bar in Figure 2.24. Remove the cover on the upper right of the electronics section and perform wiring.

● Contact output (AC) (Code: 8) (G) (L)



*1: This is not used for FM-Y, CSA-Y.
*2: The ground wire is connected to the earth bar.
*3: The ground wire is connected to the earth terminal on site.
*4: The protection ground is connected to Class D ground (less than 100 Ω of grounding resistance), which is nearest to signal interrupter.

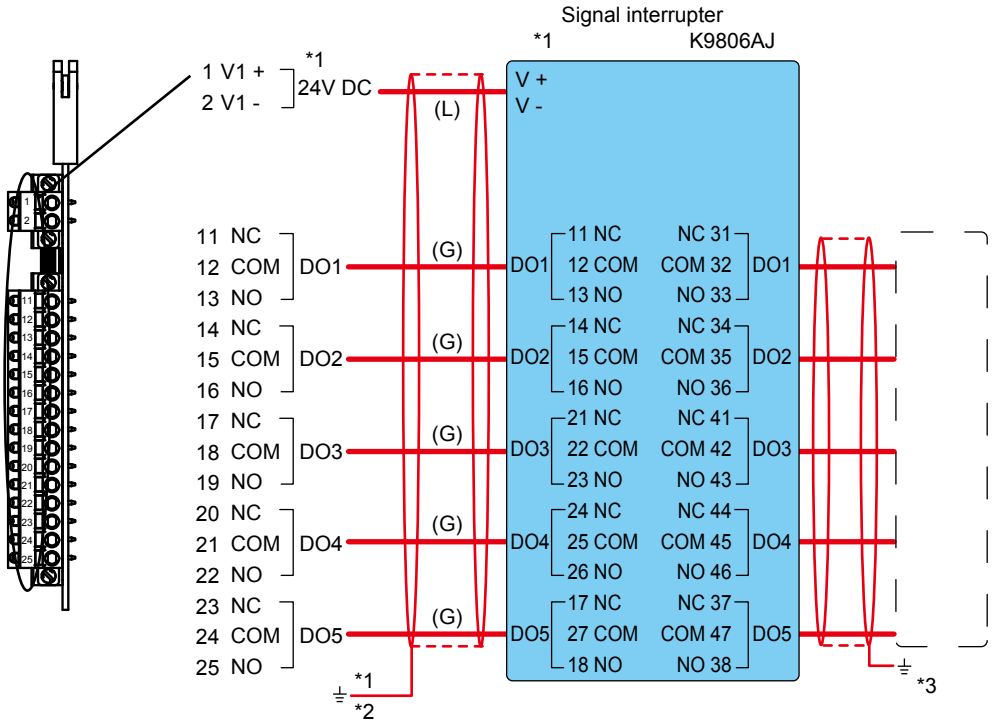
Figure 2.32 Wiring for a contact output card

The contact output card is labeled “DO”.

The external I/O cutoff output (power cutoff signal) (L) is also wired.

The shield is grounded at the earth bar in Figure 2.24. Remove the cover on the upper right of the electronics section and perform wiring.

Contact output (DC) (Code: 7) (G) (L)



*1: This is not used for FM-Y, CSA-Y.
*2: The ground wire is connected to the earth bar.
*3: The ground wire is connected to the earth terminal on site.

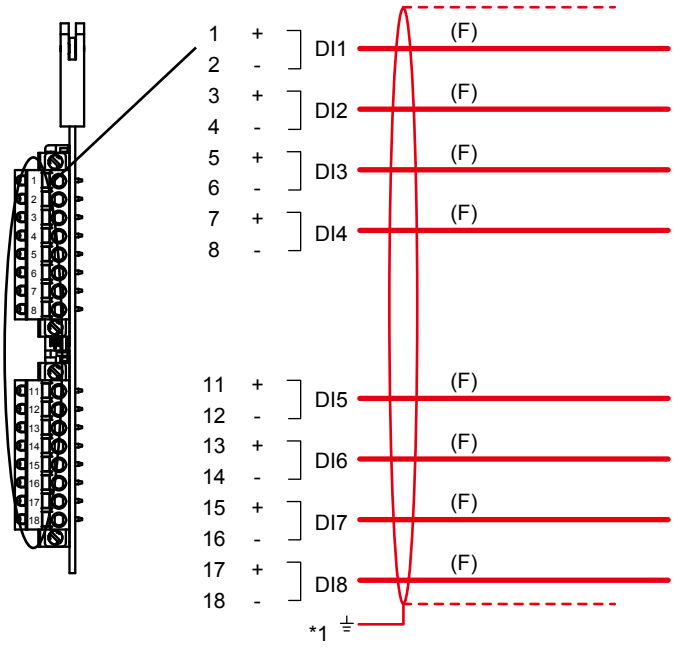
Figure 2.33 Wiring for a contact output card

The contact output card is labeled “DO”.

The external I/O cutoff output (power cutoff signal) (L) is also wired.

The shield is grounded at the earth bar in Figure 2.24. Remove the cover on the upper right of the electronics section and perform wiring.

Contact input (Code: A) (F)



*1: The ground wire is connected to the earth bar.

Figure 2.34 Wiring for a contact input card

The contact input card is labeled “DI”.

Contact input/output (AC) (Code: 6) (F) (G) (L)

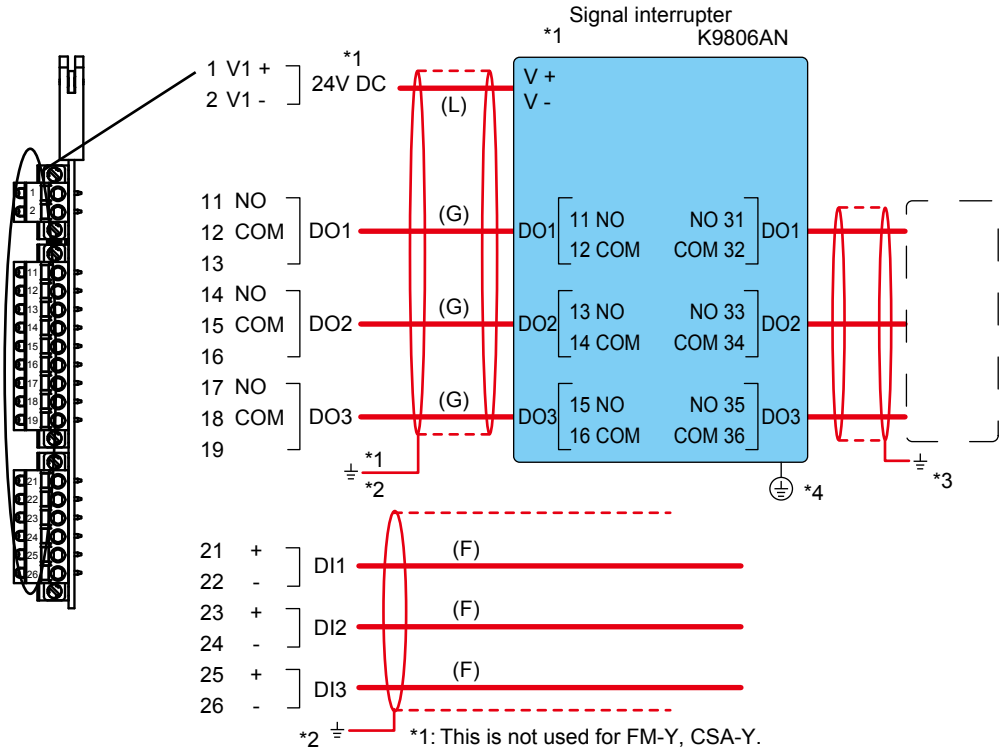


Figure 2.35 Wiring for a contact input/output card

The contact input/output card is labeled “DIO”.

The external I/O cutoff output (power cutoff signal) (L) is also wired.

The shield is grounded at the earth bar in Figure 2.24. Remove the cover on the upper right of the electronics section and perform wiring.

Contact input/output (DC) (Code: 5) (F) (G) (L)

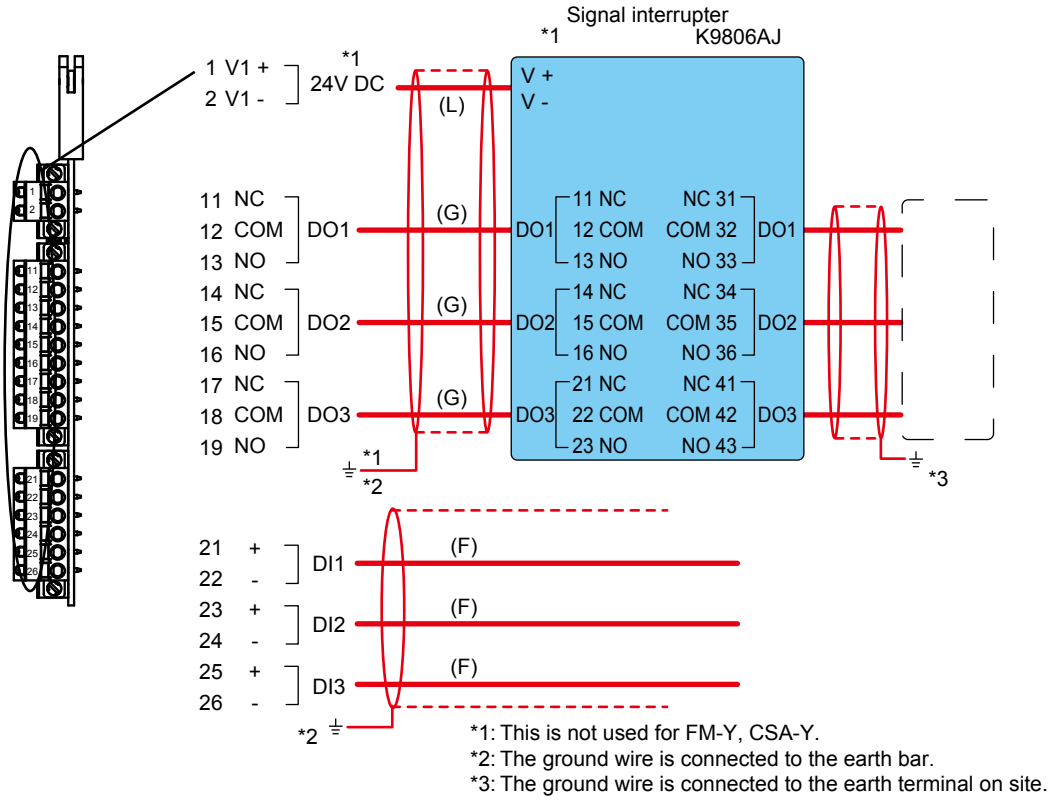


Figure 2.36 Wiring for a contact input/output card

The contact input/output card is labeled “DIO”.

The external I/O cutoff output (power cutoff signal) (L) is also wired.

The shield is grounded at the earth bar in Figure 2.24. Remove the cover on the upper right of the electronics section and perform wiring.

Revision Information

Title : Process Gas Chromatograph GC8000 Installation Manual
Manual number : TI 11B08A01-01E

Jul. 2015/7th Edition
Delete SHDSL (Pages 36, 80), Corrections (Pages P.8, 9, 14, 16, 20 to 22, 26 to 34, 38, 39, 56, 57)

May 2014/6th Edition
Type 4 is added. (Pages 7, 14, 15, 19, 21, 22, 24, 25 to 30, 32, 33, 34, 38, 39, 43, 45, 47, 49, 52, 56, 57, 58, 63, 75, 76, 79, 80)

Dec. 2013/5th Edition
NEPSI certification is added. (Pages 6, 7, 9, 13, 16, 17, 20, 21, 23, 26 to 31, 37, 43, 47, 56, 62, 67, 68)
Protection-film cover for wiring is added. Correction of errors.
(Pages 9, 16, 18, 20, 25, 32, 33, 45, 49, 52, 55)

Sep. 2013/4th Edition
Add Cautions (Pages 9, 10, 20, 33, 43, 45, 67, 68, 69, 76, 79)
Description change of Safety Standard and EMC standard (Page 37)

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CSA certification is added. Correction of errors.
(Pages 7, 11, 13, 14, 15, 16, 17, 19, 20, 21, 24, 25 to 30, 33, 36, 38, 39, 40, 41, 43, 45, 54, 56, 58, 59, 66, 69, 70, 72, 73, 74, 75, 76, 77, 78)

Mar. 2012/2nd Edition
ATEX, IECEx certification is added. Correction of errors.
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